OSHA OVERSIGHT: WORKER HEALTH AND SAFETY AT OPERATING NUCLEAR POWERPLANTS

HEARINGS

BEFORE THE

SUBCOMMITTEE ON HEALTH AND SAFETY

OF THE

COMMITTEE ON EDUCATION AND LABOR
HOUSE OF REPRESENTATIVES

NINETY-NINTH CONGRESS

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HEARINGS HELD IN WASHINGTON, DC, ON JULY 10 AND SEPTEMBER 11, 1985

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WEDNESDAY, JULY 10, 1985

HOUSE OF REPRESENTATIVES,
SUBCOMMITTE ON HEALTH AND SAFETY,
COMMITTEE ON EDUCATION AND LABOR,
Washington, DC.

The subcommittee met, pursuant to call, at 9:30 a.m., in room 2261, Rayburn House Office Building, Hon. Joseph M. Gaydos (chairman of the subcommittee) presiding.

Member present: Representative Gaydos.

Staff present: Sy Holzman, subcommittee staff director; Lee Bassford, subcommittee staff assistant; Dorothy Strunk, minority senior legislative associate.

Mr. GAYDOS. The committee will be in order.

I have a short opening statement. We have postponed some of the witnesses that were scheduled for today because we had some scheduling conflicts.

The subject of this hearing is the "Health and Safety of Workers at Operating Nuclear Power Plants," one of those areas over which OSHA and other Federal agencies have joint jurisdiction. The original plan was to have all of our scheduled witnesses appear today but, as I explained, we do have time constraints and schedule conflicts.

The testimony we will be receiving this morning focuses on radiation exposures to workers. We must keep in mind that radiation limits are the responsibility of the Nuclear Regulatory Commission and, as such, are outside this committee's jurisdiction.

Our concerns are to the general health and safety of workers at nuclear power plants and the cooperative working agreement between OSHA and NRC. The second is most important. There is always a danger that when two or more agencies have overlapping or joint responsibility for worker health and safety a gap in protection exists because one of the agencies may abdicate its responsibilities. This is an issue the subcommittee will explore in greater detail in future hearings.

Now, with that comment on other matters that directly or indirectly affect the subject matter, I will call our witnesses, representatives of the Utility Workers Union of America, who have been very cooperative with the committee in the past, appearing and supplying information if and when we requested it, and that is something we don't get from some other groups in the area.

So, gentlemen, if you want to take your place at the witness table and proceed in a manner that will best serve your purposes.

I, on behalf of the committee, want to welcome you. Thank you again for your appearance and for your kind cooperation.

STATEMENTS OF DONALD E. WIGHTMAN, PRESIDENT, LOCAL 369, UTILITY WORKERS UNION OF AMERICA, AFL-CIO; MARSHALL M. HICKS, SECRETARY-TREASURER, UTILITY WORKERS UNION OF AMERICA, AFL-CIO; OTTO K. HARLING, DIRECTOR, MIT NUCLEAR REACTOR LABORATORY, AND PROFESSOR OF NUCLEAR ENGINEERING, MIT, ACCOMPANIED BY MICHAEL J. DRISCOLL, PROFESSOR OF NUCLEAR ENGINEERING, MIT

Mr. HICKS. We would like to start first, if it is all right, with some information from Professor Harling from MIT.

Mr. GAYDOS. Sure. Without objection, at this point the entire written statement as submitted will be made a part of the record.

Hopefully, our committee members, when and if they have the time, will study the record, and apprise themselves of the contents and, hopefully, it will be very beneficial and helpful to them.

You proceed the way you want.

Mr. HARLING. Mr. Chairman, we are pleased to appear before you today and testify concerning this issue. It is a rather unique one, and it involves the occupational exposure of nuclear plant workers, as you have pointed out. I would like to very briefly say physically why there is such a problem.

There is radiation buildup in coolant systems of light-water reactors. Light-water reactors are, as you know, the current generation of power-producing machines. They are the ones that actually produce a useful product for the United States, about 15 percent of our electricity. All other types of reactors are either in a developmental phase or used for research purposes in this country. I think that is important to bear in mind because that impacts in a very true sense on the economic situation in our country; it reduces the amount of imported oil and so on.

Now, with this radiation buildup in the primary system, which is something you really can't afford completely—the laws of physics and chemistry are operable—the radiation plant workers, the people who maintain the facility receive a certain amount of dose radiation exposure. They do this during routine maintenance, repair and retrofits—all the activities that the human beings that are in the operating staff of these plants have to carry out.

Now, there are many elements to the reduction of this occupational exposure, but they can be summarized, perhaps, in three main areas:

First. Reduction of the radiation source. Drive the source term down and everything gets better proportionately;

Second. Reduction of the time at which workers are exposed to it and the levels or the intensity of those radiation fields; and

Third. The use of advance technologies such as robotics and in the future the design of reactors so that they can accommodate robotics.

Mr. GAYDOS. If I may interject at this time, it is not much different than mining coal at the face. The same three elements are

there: keeping the source down, trying to apply some mechanical means, et cetera, and move the person every now and then and don't keep him exposed too long.

Go ahead. It is just an analogy that strikes me at this time.

Mr. HARLING. It certainly has a lot of analogies in other areas.

Now, I am testifying on behalf of the Nuclear Reactor Laboratory and the Department of Nuclear Engineering, MIT, at the request of the Utility Workers Union. My colleague, Professor Driscoll, will also be making some comments, perhaps to elaborate on some of these matters.

We are testifying about one aspect of the research and facilities needed to support a sustained effort to reduce radiation exposure. Only one. There are a number of ways to reduce the exposure to workers. We are talking really about one, and we are not implying that the others are not important. They are, indeed, very important and should be pursued aggressively. I think perhaps other people will speak to that. We will not here today.

Even though individual exposures are kept within current permissible regulatory limits, the point is that high dose rates interfere with and, hence, prolong and compromise the quality of maintenance operations by limiting the time spent by the most expert workers on a particular task. Resulting losses in capacity factor translate into substantial cost penalties borne by the energy consumer, which can be in the order of a million dollars per day of added plant downtime.

If we remember that in the United States our plants have a capacity factor average of only about 60 percent, then you can see that that is a very large impact. The other 40 percent of the time they are down for scheduled maintenance or for unscheduled maintenace, for retrofits and other things. And even making a 10-percent increment decrease in that downtime means millions of bucks per plant, so it is a large problem.

I will give you another number. I don't want to give you——

Mr. GAYDOS. Isn't that inherent in the plant itself, that it is going to be down 40 percent of the time because of certain reasons? That shouldn't be in our calculations, or should it?

A plant, because of the nature of the item we are dealing with, it is going to be down. It is just like the amount of grease jobs you have to provide for a truck.

You know, why get into that aspect of it? We are talking about the exposure of a worker, as I see it in my very limited scope.

Mr. HARLING. Let me tell you why, Congressman. There are certain inherent times that the thing has to be down if everything works like a Swiss watch.

Mr. GAYDOS. I understand.

Mr. HARLING. But that is not 40 percent of the time. If we say that the Swiss reactors are working like Swiss watches, and they are very well run and very well built—they are the Cadillacs of the industry—they get a capacity factor of maybe 80 percent for their four machines average. We get 60 percent. That difference is due to inefficiencies, retrofits, and more problems.

Mr. GAYDOS. And lack of knowledge, too. Because some of these things, you know, are all conjecture as I see it. And as a scientist and an expert in your field, I think you have to agree. We talk

about the exposure, and we are talking about—just to jump off a little bit, talking about exposure you will have a certain, for instance, radon daughters, you can get so much and then you are safe.

That is all conjecture. Nobody knows. What we accept today as a safe level, tomorrow we can say, "My God, those people 2 years ago were exposing themselves to fantastic exposure." It changes. It is all conjecture because nobody knows.

The reason why these hearings, in my estimation, are so important is because a large portion of this field right now is conjecture. And I happen to come from that crazy place of Pennsylvania, Three Mile Island, and we have found so many things involved up there on rules and regulations, and things like that, that prove that nobody knew; they all just guessed. They didn't follow certain things. Even today they don't have the answer.

I don't want to sidetrack you, but I want you to know I would like to see this approached from a practical viewpoint, so that we can explain to other people—to the rest of the committee people and other people practically what we are talking about. Because I love you scientists and I respect you, but you are in a field where there are so many conflicting opinions and nobody agrees with what the other fellow says. I don't know why, but that is what it is.

Are we talking about the plant being down around 40 percent of the time?

Mr. HARLING. Yes. Mr. Chairman, let me address the last remark you made because it does address the credibility of scientists and engineers.

Mr. GAYDOS. Yes. I want to be very practical today.

Mr. HARLING. I do not see that much difference of opinion as you do, but I agree with you that that is in fact what most people see, very big differences of opinion and views. Among those people that we recognize as credible scientists and engineers the differences on these matters are very small.

Mr. GAYDOS. They are?

Mr. HARLING. Yes.

Mr. GAYDOS. I hope you will take a look at that record up at Three Mile Island because we had experts coming in, one expert saying one thing and another expert getting up and saying absolutely diametrically the opposite thing. We are talking about safety features. They even question, among themselves, as to the safety of the plant in looking at the structural plans, whether it can withstand an earthquake or not. That is what I am talking about, the conjectural aspect of your profession.

Mr. HARLING. Well, we could have discussions that would last a very long time.

Mr. GAYDOS. I realize that.

Mr. HARLING. But addressing your question of what is this 40 percent, and as I said, a good part of that is inadvertent, like greasing your car. OK? And it is likely to remain with the present machines. But that other substantial part——

Mr. GAYDOS. Is that 20 or 40 percent?

Mr. HARLING. Let's say 20. Let's say the Swiss has it down close to what is an optimum.

Mr. GAYDOS. So the efficiency of the operation, then, we have to presume is off between 40 to 20 percent because of the nature of the item or the animal we are dealing with, so that is one aspect of the cost.

Mr. HARLING. And some things that are not planned, failures of equipment and materials. But the bottom line is that about 20 percent of the outage time on the average U.S. light-water reactor is something that you have got to live with until we get a little bit better at it.

Mr. GAYDOS. OK. Let's accept that.

Mr. HARLING. That means that during that time you have those outages workers have to work on the plant and on the primary loop, and they have to get into radiation fields. That is the issue here. Is the exposure to these workers and how does that impact on their health, safety, and how does it impact on the efficiency and the cost efficiency of these plants?

And my point is this: if you can just decrease the outage time of a plant, one plant, 1 day a year, and 20 percent of a year is a lot of days, you will save a million bucks. Because one outage day of a plant is worth, in round terms, a million bucks. So we are talking about big bucks.

Now, in the report to Congress from former Secretary Hodel, they indicated that in the United States there are about 50,000 man-rems per year of exposure to plant workers. Those are units of exposure.

Mr. GAYDOS. Conjecture, too.

Mr. HARLING. Yes. And generally speaking one can estimate, and it is accepted by various experts, that a cost of $1,000 to $10,000 per man-rem is a reasonable way to put a quantitative value on that. That means $50 million to $500 million a year residual beauty defect or problem that we still have with our light-water reactors.

So, what I am trying to get across is that even a 10-percent impact on that, and we would hope that a factor of 2 impact can be made in that eventually, is big bucks and worth going after. Not only is it big bucks, but it directly influences the viability of nuclear power and the public perception of that power and the health of the workers. Not of the general public; that isn't an issue here, except that workers are a part of the general public. But indirectly.

Mr. GAYDOS. One thing I want to suggest to you is that I can't understand why you are bringing that cost in. Maybe as you go on I will understand it better. You know we have had that argument, perennial argument, from the time we passed the OSHA Act. Believe me.

We are always talking about the comparison of health and safety and what it costs to provide it. And we are back in that same old syndrome again as to the business of, if you could correct this or that or if you can just save 1 day, you have saved a million dollars. I just hope that our conclusion isn't that the primary concern is with the millions of dollars as distinguished from the health and safety we are talking about.

But go ahead. That is just my confusion, and from a layman's viewpoint.

Mr. HARLING. It is a difficult thing to put in those terms, but in fact, you have to think in those terms because you have options of

doing this or that, and the resources are inadequate to do everything. For example, you and I could buy a safer car if we are willing to pay a lot more money for it.

Mr. GAYDOS. Well, from a self-serving viewpoint, let me just say this to you. Now, my coworkers would be a heck of a lot happier if we didn't have nuclear power around because they would be mining a lot more coal and it would be a proven method of producing energy. Now since we are doing it through this new methodology, that is fine. But the fact remains when that was on the drawing board and when that plant was built, you know, those items of downtime and all I understand were inculcated into the overall consideration as to the effectiveness of the plant and cost production and all that stuff. That is what bothers me.

So, I think our problem is, as I see it, and again I don't want to get you off track—I better keep quiet and listen to you in total, and then maybe we can sit down——

Mr. HARLING. You could easily with statements about coal being more benevolent than nuclear, because that would be an area——

Mr. GAYDOS. We have a method of using nuclear energy and it isn't very cost effective. I think that is what I have gotten so far from what you are saying. All right?

Mr. HARLING. Nuclear isn't?

Mr. GAYDOS. You are saying that 40 percent raises some questions about——

Mr. HARLING. No, I'm not implying, I'm saying that is the situation right now. And you asked me about costs and how they are put together. We have to have a certain amount of downtime. There is in addition to that a certain amount of downtime that occurs because of the vicissitudes of materials, physics, and chemistry—valves breaking, et cetera. It is just like my car gets a flat and the bearing goes out. In repairing those problems and in doing the necessary maintainance so that these plants operate within their technical specifications, workers get exposed.

They get exposed to 50,000 man-rems a year, roughly speaking, in the United States. And that can be translated into dollars if you want because one of the bottom lines here is that I am going to strongly suggest and urge that we do more research and development to develop the technology to push these dose levels down and the exposures to plant workers down.

Now, that means spending some money in order to have some advantage, and somebody is going to make the cost-to-benefit analysis even if we don't like to do it here. I am saying it is very cost effective to spend about a percent of what is estimated to be the cost of this exposure per year on a project of the type that we are suggesting here which ultimately could whack a factor of two off those exposures. You got a $50 to $500 million problem. I use those wide range of figures deliberately because there are good reasons for that. Take my word for it, people don't agree in each case which number to use. It is very specific to the particular problem. But it is in that range.

So it is a decrease there of a factor of 2 ultimately. It is worth a lot in terms of monetary value, and that translates directly into man-rems, which is health effects to human beings.

What we are suggesting as part—not the whole ball of wax—of dose reduction research and development is the construction of an inpile loop at the MIT research reactor. This inpile loop would model a part of a current light-water reactor. It is a test loop. It is a facility that is heavily instrumented which runs in a nuclear environment, and we have put together a technical team, a broad range of experts—chemists, nuclear engineers, chemical engineers, mechanical engineers—who will design and who have already done preliminary design on experiments and tests. Using this loop, these tests and experiments are expected to develop technology which will enable the power reactors to reduce their source term to use the contamination solutions more efficiently to have more advanced and more effective filters to take this radioactive material out of the coolant loop before it remains deposited out where it creates the radiation fields that the workers have to work in.

Now, that is what we suggest. That is our part of it, and that is not to say that there aren't other activities that are very useful and that we would heartily endorse that you support.

We do not think that this is going to happen; that is, a significant increase in R&D in this dose reduction area generally—forget about MIT's particular approach—unless there is considerable urging from Congress. We have seen the trend over the years we have worked with DOE, and they are not committed to this at this time. They got out of light-water reactors a long time ago, and they went into liquid metal reactors, and they went into fusion, and they went into solar—all very fine things. But while that is going on the light-water reactors are producing 15 percent of our electricity, have tens of thousands of workers who are not only getting their paycheck, but also getting a certain amount of detriment from the health effects of that industry, which is much lower than coal. I have to throw that in. But nevertheless it is something we can reduce, so we ought to. And we pick up a benefit in health effects, we pick up a benefit in the time our plants are up, which translates into bucks very directly.

That is what we are here to say, and to urge you to yank the chain or push on the right buttons so that a little bit more will be done in this area. If you look at the amounts of dollars being spent for dose reduction work by the Federal Government, it is very small compared to the expenditures that are being allocated for breeder reactors, liquid metal reactors and for fusion reactors, which are things for the future and we have no quarrel with them.

Let me summarize by saying three things. The buildup on the surfaces of the LWR cooling systems, a radioactive buildup, has a major impact on the safety and cost effectiveness of these plants. Second, a multipronged R&D effort is needed to mitigate these problems.

Mr. GAYDOS. A what?

Mr. HARLING. A multipronged effort is needed to mitigate these problems. And even a factor 2 mitigation is very worthwhile.

Third, an important element of the required R&D effort should be the construction and operation of an inreactor test loop as proposed by MIT. There are no such loops in the United States anymore, there are some abroad.

[The prepared statement of Messrs. Harling and Driscoll follows:]

PREPARED STATEMENT OF PROF. OTTO K. HARLING, DIRECTOR, MIT NUCLEAR REACTOR LABORATORY, AND PROFESSOR OF NUCLEAR ENGINEERING, MIT AND PROF. MICHAEL J. DRISCOLL PROFESSOR OF NUCLEAR ENGINEERING, MIT

We are testifying today on one aspect of the research and facilities needed to support a sustained effort to reduce radiation exposure to workers engaged in the operation and maintenance of the light water nuclear reactors (LWRs) used in the United States, and in many foreign countries, for the production of electrical energy.

Others have spoken, or will subsequently speak, on broader aspects of this subject. Our remarks are focused on an approach to dose reduction based primarily on developing preventive measures to reduce its principal cause: the buildup of radioactive corrosion products on surfaces exposed to reactor primary coolant water. In our opinion such work is a necessary complement to efforts underway by others to perfect decontamination treatments to remove such deposits after their formation, or to construct robotic devices to distance human operators from the radiation fields.

We would, however, like to make some preliminary remarks on the need for dose reduction even though individual exposures are kept within currently permissible regulatory limits. The point is that high dose rates interfere with (hence prolong and compromise the quality of) maintenance operations by limiting the time spent by the most expert workers on a particular task. The resulting losses in plant capacity factor translate into substantial cost penalties borne by the energy consumer: which can be on the order of a million dollars per day of added plant downtime. If, as some estimate, the total penalty is several thousand dollars per person-rem of exposure, the total annual cost in the United States amounts to on the order of 100 million dollars per year. As more reactors come on line and as radiation fields build up with time, this burden will increase unless corrective measures are taken. We also not that proponents of advanced reactor types such as the high temperature gas cooled reactor (HTGR) and the liquid metal cooled reactor (LMR) cite, as major advantages of their systems, the prospect (borne out by experience with several prototypes) of maintenance doses which are a factor of ten lower than now experienced on LWRs.

Given the general consensus of need, what are the chances for success? The best indication may well be the fact that otherwise virtually identical LWR plants now in operation exhibit a range of exposure doses which differ by as much as a factor of five. This implies that if we can fully understand how to bring doses on all units down to the level of the best performers, a substantial advance will have been made; it also suggests that there are phenomena involved which can be enhanced by R&D on innovative modifications of coolant and surface chemistry to reduce radiation fields to values lower than those observed even in the best of the plants already on line.

How can these necessary and foreseeable improvements best be achieved? One way, of course, is to try to sort out the date from operating plants. Efforts along these lines have been underway for some time now by organizations such as the Electric Power Research Institute (EPRI), and have been productive: lending credence, for example, to the idea of coordinating the lithium hydroxide and boric acid content of pressurized water reactor (PWR) coolant to minimize corrosion product transport. There are serious limitations to this approach, however, among them being the difficulty of making precise scientific measurements on systems not built with that purpose in mind; and, most importantly, the great and understandable reluctance to operate power reactors at the extreme parameter limits often appropriate for definitive experiments. On the other hand, the neutron and gamma radiation in a reactor's core affect the deposition, radioactivation and transport of corrosion products in ways which are not yet fully understood; hence out-of-pile loop studies are not an entirely satisfactory substitute. Thus, many experts in this field would prefer to conduct research using an in-pile loop, which simulates the primary circuit of an LWR (PWR or BWR) in all important aspects. Unfortunately there are at present no facilities of this sort operational in the United States; moreover the availability of suitable foreign facilities is quite limited (and has, in fact, declined in recent years).

Because of our commitment to the objective of dose reduction and our conviction that an in-pile facility is essential to meet national needs in this area, a research team at MIT has, using in-house funding, carried out a preliminary design of an in-pile loop which could be constructed for and operated in the MIT Research Reactor. Time limitations preclude a detailed exposition of specific details here, but we are confident that our design is both technically sound and cost effective. It may also be that other designs and host reactor facilities would prove suitable—that is for others

to decide. Note, however, that we have proposed to operate the MIT facility as a national resource available to other researchers. We have consulted experts in the field and potential users and have compiled a list of some two dozen ideas for experiments (see Table 1), of which several have been highlighted for priority attention; we also have a reasonable expectation that funding for a substantial research program could be mustered given the availability of a facility. We continue to pursue utility and DOE support to advance our design and planning efforts, and ultimately, it is hoped, proceed with construction, operation and experimentation. Without going into detail on specific experiments, our review and canvassing efforts have shown that applied corrosion studies may also be an important function of a facility of this type; uniform corrosion because it generates the material which is transported through the reactor core to become radioactive; and concentrated (i.e. "stress") corrosion, because it leads to premature component failures, which then require repair in the presence of a radiation field. Furthermore, since all decontamination solutions are corrosive to some extent, an in-pile test loop is also a valuable tool in work to improve the decontamination approach to dose reduction.

Finally, we feel compelled to remark on why, if the need and promise are so obvious, progress along the lines we have suggested has been so slow. Several factors appear responsible: it is not clear who should take the lead responsibility (the DOE, NRC, vendors, utilities?); dose accumulation is a chronic problem, and it is all too human to focus on the immediate and the acute; and, finally, budgetary constrictions are severe among all of the concerned organizations. It is our hope and recommendation that this committee will encourage the long-term perspective and level of attention necessary to effect substantial reductions in the person-rem logged by U.S. utility workers, and the undesirable consequences which follow therefrom—in which event we feel our particular approach and specific proposal can be justified on the basis of technical merit.

TABLE 1: *Potential Experiments for an In-pile Dose Reduction Facility*

Experimental Program

A preliminary roster of experiments has been developed to help define the capabilities required of an in-pile loop. The list includes:

(1) Separating out the effects of radiation, heat flux and flow velocity on corrosion product releases and deposition.
(2) Establishing the optimum lithium hydroxide to boric acid ratio to minimize radioactivity buildup on steam generator surfaces.
(3) Accelerated corrosion and durability tests on zircaloy simulating high burnup fuel conditions (e.g., loop can be run at higher temperatures than current LWR's).
(4) Evaluation of the effects on zircaloy of nucleate boiling under PWR conditions.
(5) Evaluates of the efficacy and materials compatibility of candidate decontaminating solutions, those potentially used with the core in place, and possibly even at power.
(6) Testing special evolutions, such as pH shocks or temperature cycling, for their utility as crud removal tactics.
(7) Development of surface treatments for in-service/decontaminated/replacement/new plant steam generators to reduce subsequent activity deposition rates.
(8) Evaluation of special crud filtering devices such as high gradient EM units.
(9) Acquisition of benchmark data for verification of state-of-the-art computer models and measurement of specific rate constants for use in activity transport models.
(10) Testing new materials for steam generator/condenser/feedwater heater tubes, and for replacement of high cobalt alloys.
(11) Research on zircaloy surface treatments to minimize crud buildup and release.
(12) Development of devices to collect crud at the inlet/outlet of fuel assemblies and steam generator tubes.
(13) Evaluation of the effect of special additives to BWR feedwater on coolant and steam plant chemistry, materials corrosion and activity generation and transport.
(14) R & D on special instrumentation for the measurement and control of plant chemistry and radionuclide transport.
(15) Special corrosion tests (e.g. stress corrosion) to troubleshoot operating problems as they arise during steady state, transient or accident mode conditions.

(16) Fission product chemistry studies related to normal plateout, and to source-term conditions.
(17) Examination of the fate and effects of inadvertent primary coolant additives such as tramp solids and liquids entering during refueling outages, or via defective equipment.
(18) Measurement of effective cross sections for radionuclide production.
(19) Measurement of radiolytic gas generation rates and compositions during simulated accident conditions (such as the infamous TMI hydrogen bubble scenario).
(20) Evaluation of geometric and flow configurations which encourage or discourage crud deposition.
(21) Comparison of simulated grid-spacer vs wire-wrap fuel pin spacing devices for their effect on crud deposition.

The list is undoubtedly incomplete but should be sufficiently comprehensive to establish the general capabilities of the research facility. Certain types of experiments have been omitted from the list because of various constraints; these include:

(a) experiments which require the use of pins containing real LWR fuels (because of the current MIT Reactor license),
(b) experiments which require very long exposures (months to years) which might not be cost effective,
(c) experiments which require extensive on-line measurements, such as suspended corrosion product size distribution.

Mr. HARLING. Now, if you will permit me, Mr. Chairman, I will introduce my colleague, Professor Driscoll, and he might expand on some of these or, perhaps, you would like to get into coal again.

Mr. GAYDOS. Before we get to the other professor, let me ask you: The new loop, for want of a better term let's call it a loop.

Mr. HARLING. Right.

Mr. GAYDOS. You say there aren't any more in the country. Did we have them at one time?

Mr. HARLING. Yes, we did.

Mr. GAYDOS. What happened to them?

Mr. HARLING. They have been closed out. Remember, we got out of the light-water reactor research business when that technology was commercialized, and the Government sort of washed its hands of it. They said, "We'll go on to breeder reactors and advanced things."

Mr. GAYDOS. You say, then, that the loop methodology could be applied to the breeder reactor as——

Mr. HARLING. No.

Mr. GAYDOS. No.

Mr. HARLING. Not this type of loop.

Mr. GAYDOS. Not this type.

Mr. HARLING. Other types of loops. The liquid metal loops.

Mr. GAYDOS. But the principle involved?

Mr. HARLING. Yes. It could be. But there is no light-water reactor loop, domestic type.

Mr. GAYDOS. Would you say that the plants as we now have them and with the activity that we are now fostering and using in this country are, per se, dangerous and should be closed until they put this adjustable new procedure, the loop, into play?

Mr. HARLING. Absolutely not. If you look at the relative risks of nuclear power even as practiced now compared to other risks in life, including the use of coal, which we use for some of our electric production, it is a much more benevolent and benign technology. But it can be made better, and there is big leverage for spending modest amounts of bucks and we ought to do it.

We ought to do everything we can that is cost effective for health and safety and for efficiency. That is why it doesn't pay, in general, to double the cost of an automobile, but it might pay to make a small increment in dose reduction in nuclear powerplants in terms of what you get for it. That is why cost-to-benefit has to be practiced.

Mr. GAYDOS. Professor.

Mr. DRISCOLL. I am the shortwinded professor. I have just one additional point to make because it bears, Mr. Chairman, on something you said in your opening statement in terms of responsibility falling between agencies. It is interesting to me to note that the Nuclear Safety Research Development and Demonstration Act of 1980 passed by Congress—it is Public Law 96-567—directed the Department of Energy to work on practical improvements in generic safety of nuclear powerplants including radiation dose reduction.

In my opinion, very little has been done in this area despite the mandate by Congress to take some definitive action in this area. I would just like to make that as a point in illustration of something you said.

Mr. GAYDOS. Well, let me just say this, and I think you will agree with me. We had to wait until we had a Three Mile Island before we went out to New Mexico, or where have you, which appeared in the paper yesterday, to put into effect a practice meltdown. Now we had to go through a meltdown up at Three Mile Island, but now in today's or yesterday's paper they talk about the meltdown they are experimenting with.

Now, it seems to me they should have experimented with a meltdown long before we had the catastrophe that almost occurred, and had occurred partially, in the Harrisburg area. So I don't think you can blame me or people like me, particularly in the health and safety field, that have grave doubts, you know, about the thoroughness of the rules and regulations and practices in the industry involving nuclear power. Even these two or three different methods that we have here and are accepted, because it just seems that everything is trial and error.

It seems to me as a reasonable man in dealing with such a basic and inherently dangerous source of energy, and I am not against it, I support it, that we would be doing these things up front; aforesaid, rather than after the fact. That is what bothers me.

Now, that just may be a slanted and personal opinion on my part, but it seems to me that all of you professors, and I have great respect for you, have not given us a complete package. Maybe it is not your fault. Maybe the manufacturer or the purchasers of the methodology aren't paying for it; I don't know. But it seems that we are using something that we don't know everything about, just by trial and error, and before you know it it ends up experimentation with the lives of and health and safety of the workers.

Let me ask you a practical question. You said you have your cutdowns or your, say, 20 to 40 percent, regardless of what the time, is a man exposed, a worker exposed to more radiation during that period or when he is actually working? When is his exposure greater?

Mr. HARLING. He is working during that period.

Mr. GAYDOS. Yes, but I am talking about, he is working on the plant——

Mr. HARLING. On the plant.

Mr. GAYDOS [continuing]. But he is not doing——

Mr. HARLING. During the plant operation most of these systems are not accessible, or a lot of them are not accessible.

Mr. GAYDOS. He is sitting there with instruments and doing other things? They're working?

Mr. HARLING. Doing these other things. Maybe rebuilding valves or something like that.

Mr. GAYDOS. Making charts or making notes, and stuff like that. Watching.

Mr. HARLING. Most of the exposure from plant operation comes during the shutdown periods. Not all of it, but most of it.

Mr. GAYDOS. Now, it isn't done by outside personnel, is that right? It is done by those employed on site?

Mr. HARLING. Some of it is.

Mr. GAYDOS. Some of it.

I am probably ahead of myself. I ought to wait until I hear from the other ones.

Probably the technical things would have to be done by technicians, of course, and I imagine some of the other practical things would be done by run-of-the-mill employees and the nonprofessionals, as we call them, or something like that.

Would you call these workers all professionals in the industry? Are the laborers skilled, like we have in the steel industry, or am I way off base?

Mr. WIGHTMAN. Maybe this part of it I could get into.

Mr. GAYDOS. Let me hear you first. I am probably way ahead of myself.

Mr. WIGHTMAN. My name is Donald Wightman. I am president of the local union.

Mr. GAYDOS. Well, let's sum it up and get right down to the point.

Mr. WIGHTMAN. Right down to the point, OK. We represent 1,800 people. Those people work in a highly hazardous profession.

Mr. GAYDOS. All of them?

Mr. WIGHTMAN. Linemen—yes—electrical underground splicers, substation operators. By and large, we represent nothing but physical workers, including about 125 people that are permanently assigned to Pilgrim.

Mr. GAYDOS. Do you have any grease monkeys, whatever they are called, around to do just menial work, you don't have to have a college education?

Mr. WIGHTMAN. Automobile mechanics?

Mr. GAYDOS. What?

Mr. WIGHTMAN. Automobile mechanics, that sort of thing? Yes.

Mr. GAYDOS. Yes. All right.

Mr. WIGHTMAN. But by and large, transmission of electricity, we are in a pretty hazardous field like the coal miners are. When you are working on 13,800 volts, there is not too much room for error.

Our wall in our union hall, we have got one wall with just the people who get killed on the job. So, we are in a very hazardous

profession. We are out to look to reduce those hazards down to the minimum for our people.

As I said, we represent 125 people permanently assigned down at Pilgrim. During outages is what we are talking about here, primarily. We could add another 50 or 60 permanent people. These are maintenance people that go in and work on these valves and on these pumps, and so forth. Primarily, the heavy work force comes from the outside trades during shutdowns.

Our concern basically is the dose rate of radiation. I think a lot of it is speculation. I hear you talking. I am not sure just what it means. I don't know what it is going to mean to the guy 25 years from now. But right now I am convinced that we should be trying to reduce the 5 rem down lower, or as low as we can get it.

We got involved with MIT only because they came up with a plan at least that seemed to me to make some sense. Build a simulator. You can't do it on site because you can't pull down the plant for a day; you're talking about a million dollars' worth of outage. So somewhere we have got to do some research and development. Nobody is coming up with anything as far as I can see. We have talked to OSHA, the NRC—nobody seems to be coming up with a plan to say, OK, here is a goal, let's look at it, let's see if we can reduce it down.

We have, or had, a pretty dirty plant down there I think from 1973. They claimed they got a bad bunch of fuel at the beginning and it took all that period of time to get rid of it. But I have to say this: they are cleaning it up. Our workers, the guys we represent that work down in the plant, and the women, are concerned that they should have this down as low as possible. One of the areas is this here.

You said, well, is there more exposure during outages when the plant is shutdown? Well, that is what the people are going in and overhauling, is the pumps and the valves, and so forth. It is my understanding that is where the heavy doses of radiation come from. So from a practical standpoint, how do you get rid of that?

Well, it seems to me if we could get that away from those areas where our people have to work on, and I guess like Murphy's law, if it is going to congregate someplace, it is going to congregate in the worst place, and it is my understanding that is where the buildup takes place—in the crevices, in the pumps, and in the valves. So consequently, an outage comes, our people go in; they either have to go in there quickly and do the job, several people have to do the job, because of the radiation exposures. Well, we should be looking for some way to reduce that down.

We are trying to get a coal plant built in one of our other plants. We are very much in favor of coal conversion, and we are trying to do that up in Boston now. We champion that idea.

But nuclear power is here to stay. We don't say the way to cure it is by eliminating the plants. What we say is we want the workers working in those plants as safe as they can be. And it is going to cost some money to do that. I don't know what the dollar figure is, but the dollar figure doesn't bother me. It is going to bother somebody else; it doesn't bother me. I don't care how much it costs to make the plant safe for workers, or as safe as possible.

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One of the ways, again, is through this method I think. At least there is a plan there and there is a goal to try to achieve it. I don't see anything else coming around. People talk about reducing the 5 rems down lower, the levels. Even in the worst years our work has not approached the 5-rem level, but it is still there.

I have spelled it out in the little writeup I have made here, but I think we should get on with the business of doing something. Nobody is aggressively attacking the research problem, and that is what I think we should be doing. We should be looking at ways to make that place safer.

[The prepared statement of Donald E. Wightman follows:]

PREPARED STATEMENT OF DONALD E. WIGHTMAN

My name is Donald E. Wightman. I am President of Local 369, Utility Workers Union of America, AFL-CIO. Our offices are located at 120 Bay State Drive, Braintree, Massachusetts. Local 369 represents the 1800 Production and Maintenance workers employed by the Boston Edison Company including employees who work at the Company's Pilgrim Nuclear Plant located in Plymouth, Massachusetts.

Our members, in general, work in a highly hazardous environment, whether lineworkers on high voltage lines, underground splicers working in underground electrical chambers or operators in one of our Fossil or Nuclear Plants. The work inherently encompasses a high degree of risk to employee safety and health. We are constantly seeking better equipment, training standards and regulations which reduce as much as possible safety and health hazards.

My purpose today is to discuss those members of Local 369 who are working at our Nuclear Plant at Pilgrim.

At the present time, we have approximately 125 members working permanently at Pilgrim Station as Nuclear Plant Operators, Nuclear Maintenance Mechanics and Chemical Radiation Protection Workers. During overhaul and refueling outages, we have a number of other members assigned temporarily to supplement the permanent work force.

Nuclear radiation exposure has become a major concern which utility workers in Nuclear Plants nationwide must deal with on a daily basis. According to Nuclear Regulatory Commission records, the workers at the Pilgrim Plant have been exposed to relatively high radiation compared to other workers in the industry.

In 1980 and 1981, Pilgrim led the list of boiling water reactors in total worker exposure. Much of the problem, according to both our Union personnel working at the Plant and Company Management, traces back to the early days of the Plant. For the past two (2) years, the Company has been thoroughly cleaning the Plant to reduce radiation.

Current exposure to nuclear plant workers is about 52,000 man rems yearly. This figure has increased four-fold in the last ten (10) years from 13,000 man rems to the current figure. This Government allows nuclear workers to receive a maximum dose of five (5) rems per year. Even the Pilgrim Plant's worst utility workers dose average in 1976—2.01 does not approach the maximum dose allowed. However, there is a concern in the nuclear community that five (5) rems per year is far too high. If doses are to be kept as low as reasonably achievable (The Industry Policy ALARA) then we must begin to work to decrease radiation fields in power reactors. It is in the public's best interest as well as the workers to decrease the radiation fields in Light Water Reactors.

There are a number of areas that must be addressed to decrease radiatin dosage fields in U.S. Power Reactors. One of those areas is does reduction through coolant chemistry and corrosion research and development. This will permit repairs in the coolant circuits to be done faster and more safely because radioactivity levels will be reduced in areas where operators and maintenance personnel must work.

Light Water Reactors have high radiation fields which cause exposure to workers. Due to the high radiation dose received while working in this area and in order to minimize exposure, workers either hurry to accomplish jobs or have several different workers complete the task. This causes a potential for decreased plant safety.

While work on dose reduction in Nuclear Power Plants through Coolant Chemistry and Corrosion Research and Development is in progress, we believe more needs to be done to quickly reduce a major problem.

Industry, through the Electric Power Research Institute, is currently spending considerably more than the Federal Government on Research and Development in this area.

The members of our Local working in Pilgrim have supported for some time a project proposed by the Nuclear Reactor Laboratory and the Department of Nuclear Engineering at the Massachusetts Institute of Technology which outlines a research and development effort designed to reduce radiation exposure to operating personnel at Light Water Reactors.

We urge the Federal Government to recognize its responsibilities and support Research and Development which could lead to new techniques for dose reduction.

Mr. GAYDOS. From your viewpoint, do we have any statistics as relates to the workers? Have you accumulated any where you could attribute any of their disabilities or health hazards directly to the problem we are talking about like the overexposure? Do we know?

Mr. WIGHTMAN. I didn't say overexposure. What I said is I think heavy exposure during those periods of time. I think that is when we have the so-called, some people call them sponges and other people come in, absorb radiation doses and get right out of the plant. There has been countless articles written about the Pilgrim plant, where a lot of statistics have been quoted out of on the radiation dosage. One particular item that was recently in Boston magazine about the nuclear gypsies who come into the plant and do just that, absorb it.

I guess my point is I don't represent them so I have a hard time. I represent the people that are working there 365 days a year. Marshall Hicks, who is the national secretary-treasurer, will talk about nationally. I am just talking about one area that I was concerned about.

I brought it to their attention, and we have been trying to do something through letter writing from our own people to various Congressmen, to let's start doing some research.

Mr. GAYDOS. You understand how difficult it is going to be for myself, personally. I profess ignorance publicly on this subject matter. We are going to ask probably some very simplistic questions because we have to get this in proper perspective because we have a jurisdictional problem here with the nuclear people. Of all the millions of workplaces we have, we don't even have enough inspectors to take care of what we have; now we are in a very highly technical field dealing with radiation. So you see we have to learn things from the ground up. So, if you would be patient and understanding. If I ask you some simple questions, don't feel too badly about it. I hope that I am going to learn from it.

Go ahead.

[The prepared statement of Marshall M. Hicks follows:]

PREPARED STATEMENT OF MARSHALL M. HICKS, SECRETARY-TREASURER, UTILITY WORKERS UNION OF AMERICA, AFL–CIO

I am Marshall M. Hicks, Secretary-Treasurer of the Utility Workers Union of America, AFL–CIO. I am here today to urge consideration of continuing research necessary for the reduction of radiation doses for workers in the nuclear energy industry, many of whom are members of the Utility Workers Union of America although many others are affected as well.

The Utility Workers Union of America has represented workers in Nuclear Generating Stations from the late 1950's and early 1960's and has during all those years supported the continued growth of the nuclear energy industry so long as the appropriate measures were taken to adequately protect the workers and the public and we continue to support that premise. The Utility Workers Union of America does

not, in supporting this additional research project, do so because the protection of workers and the public is so deteriorated that our support is no longer appropriate. We support the research project because we understand the inherent effects of radiation exposures on workers and that such effects can be further limited by a reduction in the doses received.

The process we are supporting that we have referred to as "Radiation Dose Reduction Through Decontamination" is a process of using chemical solutions to remove the "crud" or "corrosion products" from piping and valves in the nuclear plant systems before maintenance and repair work is initiated. This is similar to a process you are all familiar with, that of flushing a radiator on an automobile. The research that is being proposed is one which will be designed to ascertain what chemicals and which processes can be used to best eliminate the corrosion products which become radioactive and are then deposited on the inside of pipes and valves in the reactor cooling systems and other systems in which the reactor water has access.

We believe a research project such as that being proposed here today is necessary for the following reasons. You have already heard that the current collective radiation exposure to nuclear plant workers is approximately 52,000 man rems per year and that the increase has resulted from the addition of a number of reactors and from the fact many of the reactors are getting older and the longer periods of time to complete the maintenance and repair work in areas where radiation is encountered.

As this situation became more apparent and greater, attention was focused on the need to reduce radiation exposure of workers so the Nuclear Regulatory Commission developed Regulatory Guide 8.8 entitled "Information Relevant to Ensuring That Occupational Radiation Exposures at Nuclear Power Stations will be as Low as is Reasonably Achievable" or "ALARA" as it is referred to in the industry. This guide was developed in 1977 and it contained a provision entitled 'Crud Control". Sub-Part 4 of that section states: "Crud can be removed from primary coolant by high-temperature filtration (graphite or magnetic filters) by reactor water clean up systems, by isolation and chemical decontamination of major serviceable components of the system and by draining and flushing the system".

Even though this ALARA concept was embraced by the industry in 1977, no serious research to meet this "Crud Control" problem was intiated by the industry in this country. And, while we understand some progress in this direction has been made in recent months, there is still much yet to be done. There are basic problems involved in finding the best method for removing or flushing out the crud from the reactor cooling systems. The removal of corrosion products have been accomplished for many years by the use of strong acids, however, such a process for the reactor coolant systems could cause much greater exposures and greater down-time for the equipment. The strong acides can cause further corrosion of the base metal in the piping, valves, and equipment bringing about more frequent and greater need for repairs and maintenance and thus, greater opportunity for additional radiation exposures. Other types of chemicals that will not cause greater corrosion problems are so weak they take a much greater length of time to act and dissolve the corrosion products adhering to the pipes and equipment and are not nearly as effective as the strong acides in eliminating the radioactive corrosion products.

In addition, we believe this research project should be given considerable consideration in view of the fact neither the industry or the Department of Energy seems to have a strong interest in going forward with its own proposals.

With regard to the general health and safety of workers in nuclear plants, we find our organization at odds with some of the positions of the industry and the Nuclear Regulatory Commission, both of whom have accepted and embraced the concept espoused in Publication 26 of the International Commission on Radiological Protection.

The ICRP system of dose limitations has three basic components:

(1) No practice or operation involving exposures to radiation should be adopted unless its introduction produces a net benefit, that is, the practice must be justified;

(2) All exposures shall be kept as low as reasonably achievable (ALARA) technological, economic, and social factors being taken into account, and

(3) The effective dose equivalent to individuals shall not exceed the limits (including provisions for planned special exposures) selected for the appropriate circumstances.

We basically agree with the first component that no practice or operation involving exposures to radiation should be adopted or practiced unless there is some redeeming benefit to justify it. Item 2 opens the door to the "cost-benefit analysis" which seems to be a major consideration for providing protection for workers, not

only in the nuclear industry but others as well. We find it most difficult to place a dollar value on a workers' health as opposed to cost of engineerig considerations necessary to eliminate the hazard or the time necessary to clean up crud before placing workers in a highly radiated area.

The position espoused by the EPA and NRC in providing guidelines and standards for protection against radiation give us even greater pause. The EPA has accepted the recommendations of ICRP 26 as its own guidelines and the NRC has designed its standards from those guidelines.

The NRC states in its proposed rule for 10 CFR Part 20—Standards for Protection Against Radiation; "In instances where practices are pursuant to, or consistent with National Policy Statements or federal legislative actions it is concluded that a judgement on net benefit has been made prior as an intrinsic part of the policy of legislative process. The issue of benefit trade-offs is thus broader than providing protection against radiation, and the revision of Part 20 contains no requirements to justify the activity or determine net benefits derived." If I understand this statement correctly, it means once a national policy is stated to proceed with construction of nuclear generating stations, anything done to further that policy is already preordained as appropriate irrespective of the problems it might cause.

As to specifics however, we have difficulty in accepting the NRC's position on increasing the Maximum Permissable Concentrations of specific airborne or waterborn radionuclide solely on the basis it may not increase the individual's total body burden in a given annual period. This of course flies in the face of the ALARA concept. The industry has been able to maintain the Maximum Permissable Concentrations within the lower limits perviously required and there is no reason why it cannot continue to do so.

The combining of internal and external doses in itself is not objectional however, the fact limits and determination of exposure doses can only be determined through the application of a complex formula makes it near impossible for the layman to determine for himself whether or not his limits have been exceeded.

The proposed elimination of the quarterly dose limits and the "dose-averaging provision" with a lowered lifetime cumulative total seems to me the burden is passed to the individual worker in that he can accumulate his maximum lifetime accumulation well in advance of his retirement age and thus be prevented from continuing to work. Under the new proposed rules, the annual limit of 5 rems can be exceeded by "Planned Special Exposures". The proposed rules would permit an individual worker to be exposed to two times the annual limit for a single event in addition to the 5 rems annual limitation. In other words, 15 rems in a given year. These special planned over-exposures can occur until the individual has accumulated an additional exposure of 25 rems which will put him five years closer to the time he will reach the maximum lifetime limit.

It would appear to us that if there is sufficient time to plan the over-exposures, the time could well be spent in reducing the radiation in the area, allocating working time in the area to prevent the over-exposures or insulating the workers from the radiation source. We do not believe there is a necessity for planned over-exposures under normal operating conditions.

It must be remembered that the proposed revision of Part 20 specifically states the limits apply only to normal operating conditions and in emergency conditions the exposures could be substantially greater than the established limits.

Mr. HICKS. Let me respond to a couple of things you have raised up till now, and then we will go ahead with the statement.

One of the things, you mentioned about waiting until recently to try a meltdown. They did try one back in the early 1960's in Arco, ID, and all it did was turn the water brown. I don't know how far they went with it, whether they stopped too soon or what, but they did make an attempt back in the early 1960's.

Mr. GAYDOS. They attribute that to an unsuccessful attempt.

Mr. HICKS. Yes. That was a Government operation. Maybe that was the problem.

Mr. GAYDOS. All right.

Mr. HICKS. Anyway, the other point, you asked about the time when the greatest exposures was, whether it was when the unit was down or when it was up. The reason for that is that the specific areas of high radiation at the time the reactor is critical are off

limits. They are locked behind gates and they either don't make any entry there whatsoever or, when they do, it is a controlled entry for a very short period of time. It is in and out and the door is locked back. So that is the basic reason.

And again, to what the others said about during the time that it is shut down is when they are able to go into those areas and do the repair work, it is necessary for them to get into the high radiation areas at that time.

But I just want to say for the record that I have been involved in dealing with this particular question since 1961, so it is not new. And we, as the Utility Workers Union, have represented nuclear generating station workers from the late 1950's, and still do today.

One of the reasons that we have felt that this research project that is being proposed is significantly important is that during the current fiscal year there is almost no research being proposed either by the Department of Energy or the Department of Defense, both of whom are involved in nuclear activities. And my understanding is that for the next fiscal year coming there is absolutely no research being proposed whatsoever in this particular area. So with that, I think there is something that should be done.

We might just say, too, for the record, we are not amongst those who believe that the nuclear industry should be shut down. We think it should be operated safely, and we always have. And we think it can be done.

Now, I might just maybe make this business that we have been talking about a little bit practical in terms that eveybody might understand it. What we are talking about is similar to flushing your car radiator. A car radiator builds up with crud and corrosion, and to get that cleaned out so that it works better, you put in some kind of a chemical ingredient and it loosens up all the crud and you flush it out. That is basically what we are talking about here, with the exception that we are saying that in addition to flushing it out and cleaning it before you work on it there should be involved in this a process of continually cleaning out and keeping the pipes and valves and equipment clean on the inside, so that this radioactive crud is taken out and filtered and done away with.

Mr. GAYDOS. Is that the loop we are talking about?

Mr. HICKS. Right. And when the professor said there isn't any in the United States anymore, I think he is talking about a research loop, because all the reactors have a cooling loop to cool the reactor and to keep the——

Mr. GAYDOS. I thought those Europeans had gotten ahead of us again like they do in everything else. You know, they have a loop going over there and we don't have anything, or we discarded it. Like we had to take the submarine over there to have it accepted.

Mr. HARLING. They do have loops for test purposes in Europe.

Mr. GAYDOS. In Europe. OK.

Let me ask you a practical question. Do we have any statistics which would inflame this committee and get them all worked up? Now, you know you are going to have to go back very hurriedly to the beginning of this committee. We never had an OSHA Act in this country until some 15 years ago. We got an accumulation of a lot of statistics, and that is how we got an OSHA Act. That is how we got a Mine Safety Act. That is how we got a Black Lung Act.

Now, we have got to have statistics. We have got to have you tell me and tell the committee and put on the record that this nuclear power is causing such and such injury to such and such people and these are the statistics. If you don't, we are going to be floating around up in the sky somewhere without being able to influence our colleagues on the committee or Members of Congress. We would be just spinning our wheels. I have to be very practical with you.

Mr. HICKS. I think to try to give you statistics of the number of people who have died or were injured from it, we can't do that because there aren't any. And I think to clarify a little bit of what we are concerned about in this particular case is because what we are talking about is a kind of a dose relationship that happens day-in and day-out for months and years, and so forth, and nobody really knows—I think both the professor and the other speaker said that. Nobody really knows exactly what that is doing to anybody. Everybody has some ideas, but I think nobody really knows.

We have people who have worked in nuclear plants since about 1960, which is 25 years. Some of these effects may not show up for 30 years or further down the road, we don't know. And I don't think anybody else does. But the point we feel is that every effort should be made to reduce those. Both the scientific community and the safety community all agree that they ought to be reduced as low as possible, and we think this is one way of doing it.

Also, the Environmental Protection Agency has some involvement in this particular area as well, and we are not totally sold on their complete approach to what they are doing at this particular time. So I don't think we can say to you or the committee that people are dropping like flies out there because it just doesn't happen that way. It is a type of a circumstance that, while with black lung disease the residual is still in the lungs and you can check that out and test it, but once the radiation penetrates the skin and destroys the cell, there is no way of measuring it because the body will probably get rid of that destroyed cell.

Mr. GAYDOS. Pneumoconiosis was insidious and it took years, 250 years in this country to discover it because of a lot of misconceptions. It seems that radiation damage or disability would be much more readily discernible, you know, from a scientific or a medical viewpoint. Maybe. I don't know.

Mr. HICKS. The reason that was not possible up until now is because the dose levels which they talk about, 5 rems per year, is probably about 500 times less than what is clinically observable.

Mr. GAYDOS. Then are we saying we almost have a like situation; we have to wait for a lot of time before we have physical evidence of accumulation over time and repetitive dosages at that lower amount in order to effect some discernible type of deterioration in the skin or blood or what have you? Is that what we are talking about, Professor?

Mr. HARLING. What we do know is what happens at high doses, where the effect is observable in a lifetime of a researcher or a lifetime of a million mouse experiment. And we are extrapolating down to much, much lower levels where we think the health effects are negligible and much smaller than other risks of normal human existence, and that is where the standards are set.

But I don't know of anybody who believes that even at those low levels it is a plus. It is just that the effect of having something less than 5 rem per year is smaller than other risks in your normal life. But it is negative. It is not positive. And the fact that there is a very strictly enforced regulation underlines that. And that regulation which doesn't allow a plant worker to be exposed above 5 rem dictates that we have to use a lot of additional workers who run in and out sometimes to do a job which a skilled in-house worker would do a lot more efficiently.

That increases the total population dose, but it is allowed by the law. That is not good. Maybe the work isn't done quite as well if you have 10 people doing one job than if one person who is on site and knows the plant very well. So that affects, then, the potential for a safety hazard. Then in order to prevent that you have to put extra time in on it to double check. The net effect is you have increased the people exposure, which is not good, and you increase the cost. If you can knock the dose down, you gain every way. There is no way you lose. And if you can do it cheap enough, you ought to do it.

Mr. HICKS. I would make a couple of other, maybe practical, approaches to give you a better understanding, maybe, of what our concerns are in this particular area. Corrosion control in generating boilers that are fired by coal or other fossil fuel isn't a new concept. What we have in this particular circumstance is, in the other plants the type of corrosion products that are built up on the pipes and the valves and the pumps, it wasn't radioactive, it was just dirty. There was also was a circumstance at that—in that type of particular circumstance they can put in copper sulfate or some other strong acid and wash it out in pretty good shape, and they don't have to worry about any damage they do to the piping because it is probably some steel alloy. But the types of alloys used in nuclear plants prohibits the use of strong acids for such purposes because it attacks the metal components of the system to such an extent that you are going to cause more problems, rather than correct them, by using strong acids for this purpose.

So, there really isn't any handy answer to say, you know, run down to the chemical plant and bring back a truckload of copper sulfate and we can wash all of this stuff out. It just doesn't work that way with the nuclear plants. That is why we think that the research effort was kind of short circuited.

We wanted to point out to you that in 1977, I believe it was, when the Nuclear Regulatory Commission established what they called their allower guidelines, which included a section on what we call crud control. That is the term used in the plants; they call it crud. Part of that effort was to instruct the licensees who run the plants to find some way to accomplish this. And to our knowledge, there was no research done in this country at all up until about 1981 or 1982, when in one location they tried a system that was developed in England, which they claim is somewhat successful. But insofar as putting any extensive research into this type of activity, there hasn't been, to our knowledge, at all. So that was one of the reasons that we thought there ought to be something done.

We might just say, while we are on the subject of general safety matters, that we have for a period now of 5, 6, 7 years been in opposition of turning over to OSHA the total matter of radiation protection. We think we have good and sufficient reason for our position on that. We know that about 5 years ago there was some discussion, and maybe your committee was involved in it, about such an activity.

The reason we would be opposed to turning over the responsibility to OSHA is the lack of enforcement powers within OSHA itself. They are pretty much limited to, when they go into a location, that they can file a citation, and levy a fine, and give the employer a specified period of time to make corrections on what they find wrong; whereas, on the other hand, the Nuclear Regulatory Commission has the authority to shut the plant down the day they walk through the door. They can stop an operation that is being performed unsafely. And we think that is a heck of a lot more authority than being able to levy a small fine.

Mr. GAYDOS. Well, those are the questions we are going to be asking the administration, you know, when they come in in a few weeks.

Let me ask you, what about your collective-bargaining agreement? Has the safety factor been a subject in any of the clauses incorporated in there? How do you handle it? And how do you handle it particularly in the light of such a highly technical question that the professional opinions are so divergent on? How do you handle the safety?

Mr. HICKS. Well, one of the things that developed over a period of years, in the early days when the nuclear industry was first getting started, we were somewhat disturbed about the approaches that were taken. The unions did, including our union, raise this particular question about the radiation protection, and we were a little bit dismayed that some other unions approached that by making an agreement with the employer that they would pay portal-to-portal pay rather than deal with the question of radiation protection. And that went on for a period of, up until about the middle 1960's. That was the approach that most of the employers and the unions took; is that when they complained about the safety factor of nuclear exposure they gave them some more money and that seemed to solve the problem, at least temporarily.

And until Three Mile Island and its subsequent publicity that seemed to be the major concern, in that as long as they paid a little more money that seemed to at least, if it didn't solve the problem, at least cut down on the screaming for a little while.

We are really not, at least our union doesn't follow that position. We believe, as was stated by some of the other witnesses, that protection ought to be provided regardless of the cost, and we don't think that a few dollars to have the guy buy a couple more six-packs a week really compensates him for what he puts up with. So we have taken a different approach, and we spend a lot of time with the NRC, the EPA, and anybody else who will listen to us, on some of the issues where we think they are not totally correct.

We are not of a position to say, again, that they are killing people right and left by the regulations that are in effect. We think that there are some improvements that can be made on it, we

think that research can help that, and that is the direction we feel we should go in.

Mr. GAYDOS. I think I have a better understanding myself, personally. I am very disappointed we don't have other members of the committee here to at least be exposed to it fundamentally, as to just how the problem starts. Because what I see immediately running through the whole grain of this problem is the product liability concept, you know, as to those that design, those that manufacture and those that install this type of an operation.

Mr. HICKS. That was a problem for many years in the industry, too, because the only one who could be an owner of nuclear fuel was the U.S. Government.

Mr. GAYDOS. I remember that. That is right.

Mr. HICKS. So it is kind of difficult to sue the product supplier in that type of a circumstance. There are some private suppliers of fuel.

Mr. GAYDOS. With deregulation, you know, problems accompany it.

Mr. WIGHTMAN. You asked, Mr. Chairman, from a local level how we handle safety problems. And again, we don't prostitute ourself over money. The money is not the issue. We deal with it. This is not the only concept we are looking at. For example, we want them to install more demineralized water ports, so people can look through windows to take oil readings and forth. Costly, but that is something that will stop a person from going into a hot area, if they can look through a window. We are looking for better shielding, and so forth.

But we don't tradeoff. We are concerned about the quarterly dosage, how it was accumulated. A person might at the end of a quarter pick up all of his dosage and go into a new quarter free. But we address those problems.

And I have to say this about the company, who we are not usually on the best of terms with. At the nuclear plant, safety has been an important ingredient of it.

The last thing I would like to just mention, because you raised a very good question, are statistics.

Mr. GAYDOS. Maybe you don't need the committee.

Mr. WIGHTMAN. You raised a very good question on statistics. And you said "if we had some statistics," and I guess you could bang somebody over the head with it. I was thinking if I was sitting here 40 years ago, and I worked for a company that was working on asbestos, how could I answer that question for you. And I think radiation is very much the same thing.

What is going to happen to the 25-year-old worker who will spend his industrial life in the plant? I am not sure, but I want to use every avenue we have got to ensure that his working life when he finishes it will be time enough to enjoy retirement. Basically I think I have to answer your question that way.

Mr. GAYDOS. Well, after we hear from some of our Government agencies and are in a position to compare what you have said in your written statements and what they tell us, I am sure there will be a lot of questions that will present themselves.

Mr. HICKS. We will probably be present for the other hearings if we get notification.

Mr. GAYDOS. I would hope you would be.

I tell you, one of the practical problems that I have to face along with members of the committee is exactly what we would do, if anything; what we could or should do, and what the evidence dictates us to do. Because it is a very controversial area, and we have our other problems. Not that we would want to negate this problem or put it under secondary consideration, but dealing with and being frustrated by OSHA, the concept and the application and the change of administration, as soon as we get one administrator coming along, percolating a little bit, they are gone and another one comes in. It is just complete, unadulterated frustration, I want to tell you that. Many times I have thought about changing my committee assignment because of it.

But I want you to know that I think that inherent probably in the position that I hold is the realization that somebody has got to do it, and with all the frustration somebody has got to stick with it. It is the most unappetizing subject, probably, in the whole Congress because we have gotten our ears beat in on the floor for the last 10 years. They have been trying to destroy the act. And I mean destroy it; emasculate it, and rub it out.

So under all those conditions I want you to know that probably one of the biggest problems I have is to engender in the committee members, you know, No. 1, an interest; and second, the practical analyzation of what you are going to be telling us and what you have told us as to what we can do to help the problem in good conscience. But it is a very difficult thing.

We took the committee through the mines up in Colorado where you have the mining of the nuclear material. We spent a lot of time in there. The people that mine all day are usually family affairs, two-, three-, four-man operations, way up where the crows fly on the high part of the mountain. We find out now there is a very serious problem as far as exposure to that uranium. It appears in very small thin layers, and when you are in that mine I guess it just envelops you.

So you see, those are some of the problems the committee has. I am just trying to get that like type of an affiliation, or association, with the problem you have, and what we could do, if anything, about the matter. We are probably going to be taking some kind of legislation to the floor next year, we believe. We have been talking about it. That might be on hazard notification. We are going to be going into some very serious and heavy hearings to hopefully get that legislation ready after the first of the year. In there is this problem. Whether you are a hazardous industry, what kind of notification and what it should consist of, and things like that.

Mr. HICKS. Let me make one more comment about this circumstance where we don't know where OSHA would be and where the NRC would be. When we are talking about this particular type of circumstance, we are talking about a chemical material needed to get this crud out of the equipment. We don't know what that is going to eventually end up to be, the best substance to do that. It may be toxic before it is even introduced into the system.

Mr. GAYDOS. You are going to find some kind of chelating agent to clean that crud out.

Mr. HICKS. Right. As I say, what the research turns up as to what might be the best substance to use, we might not like to use it anyway.

Mr. GAYDOS. That is true.

Mr. HICKS. So that is all a part of this whole ball of wax. I think that area would fall under the OSHA's jurisdiction as opposed to the radiation, after it comes out the other end, would be the NRC's jurisdiction.

Mr. GAYDOS. I just hope that the designers of the facilities we are speaking of have had a little more luck in designing something that doesn't result in what we saw happen in the coal industry, in the textile industry, in the red lung industry, up front with the ore mines and things like that. I just hope that it is not the case where 30 years from now, after I am gone and everybody else on the committee, and a new committee is sitting here and is considering cases of zombies and sterile people and people that have had their life expectancy cut short, you know, I just hope that is not the situation, and I hope that we are taking at least not too tardy of a step to take a look at the problem and hopefully solve it.

Mr. HICKS. I might just give you another thought while you are on that. It doesn't really affect our industry as much as it does the other ones you were talking about, but a part of a new proposal from the NRC and the Environmental Protection Agency allows an increase in the airborne radionuclides in a work area, which we don't have that big a problem with it. But in the mining and the fabrication plants they do have that. That is another argument that we have had with them in recent years.

Mr. GAYDOS. So the sensitivity and response just seems to be the opposite as to what you would consider as far as the safety and health of a person is involved.

See, again that element, and that is why you and I, professor, had a little misunderstanding of what you were trying to emphasize, because we always have the economic aspect of it, which is valuable and can't be denied. You have to have the economic consideration in the formula, I guess; but how much importance it has is open to debate, you know.

Maybe my best bet to serve the problem is to join you fellows when you go over there before NRC for something, you know, and put the problem in their lap, and hopefully get some research funds and maybe let them do some things.

But in all seriousness, I really appreciate your appearance. And if you would respond to any questions we may send to you, we would appreciate it. We are going to wait and see and then, if we may, we would like to call you back for some really detailed questioning possibly sometime in the future as we progress on the hazard notification legislation, on which we contemplate full and exhaustive hearings starting in September. So we should be here in session in September and October at least, depending upon what the budget thing is. So maybe we will have you back again, and I will be better prepared for you.

Thank you so much for your appearance.

This concludes today's hearings. The subcommittee will recess until the next hearing, July 17, in this room, at 9:30 a.m.

[Whereupon, at 10:35 a.m., the subcommittee was recessed, to reconvene Wednesday, July 17, 1985, at 9:30 a.m.]

OSHA OVERSIGHT: WORKER HEALTH AND SAFETY AT OPERATING NUCLEAR POWER PLANTS

WEDNESDAY, SEPTEMBER 11, 1985

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON HEALTH AND SAFETY,
COMMITTEE ON EDUCATION AND LABOR,
Washington, DC.

The subcommittee met, pursuant to call, at 9 a.m., in room 2257, Rayburn House Office Building, Hon. Joseph M. Gaydos (chairman of the subcommittee) presiding.

Member present: Representative Hayes.

Staff present: Sy Holzman, deputy staff director; Lee Bassford, staff assistant, Dorothy Strunk, senior legislative associate.

Mr. GAYDOS. The subcommittee will be in order.

I want to explain to our witnesses that there is a caucus in process and there is a markup session. Hopefully our colleagues on the committee will have an opportunity to review in depth what you say. So let's just all hope that.

Today we are concluding our oversight hearings on worker health and safety at operating nuclear power facilities. Our witnesses represent the Nuclear Regulatory Commission and OSHA, each of which has responsibility for certain safety and health considerations at these powerplants.

The issue of joint jurisdiction between OSHA and other Federal agencies, as outlined in section 4(b)1 of the OSHA Act, is one with which this subcommittee is very concerned.

The issue has been raised in previous hearings and will be the focus of more attention at hearings in the future.

Obviously, each of the agencies is well aware of its jurisdictional rsponsibilities, but the question with which we are faced is: Do these agencies, through their agreements and discussions, successfully insure the health and safety of workers generally?

The question is a valid one. The International Brotherhood of Electrical Workers surveyed nuclear power stations where its members work and reported the results in a letter to the subcommittee, and we have it on record. The survey replies covered 31 operating nuclear powerplants, including some sites with more than one nuclear unit. Eighteen replies indicated that there had never been a routine inspection by either Federal or State OSHA and no inspection requests were ever made. Four replies knew of no routine inspections by Federal or State OSHA, but as each of the four has had a fatality, OSHA has responded, of course. Seven locations

indicated there had been routine OSHA inspections as well as fatality inspections and one report stated there had been no routine inspections as well as no inspection following a fatality. One report noted that state OSHA had conducted a routine inspection and a final report stated that there had been no routine inspections, but on two occasions the local union had requested OSHA to inspect unsafe working conditions, but OSHA inspectors were denied access by NRC.

Without objection, I will make this letter from Charles Pillard, president of IBEW, part of the hearing record.

[The information follows:]

INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS,
1125-FIFTEENTH ST. NW.,
Washington, DC, August 14, 1985.

Hon. JOSEPH M. GAYDOS,
Chairman, Subcommittee on Health and Safety,
House of Representatives, Washington, DC.

DEAR CHAIRMAN GAYDOS: This will supplement my letter of July 10, 1985, to you concerning the meeting Robert Macdonald, Director, IBEW Utility Department, and Paul Shoop, IBEW International Representative, had with Sy Holzman on July 1, 1985.

Mr. Holzman in the July 1, meeting expressed concern about tracking the amount of radiation exposure received by itinerant contractor employees and electric utility employees assigned to nuclear generating stations. Also, Mr. Holzman raised the question of the Occupational Safety and Health Administration inspecting nuclear power plants relative to worker safety in areas not covered by the Nuclear Regulatory Commission.

In my letter of July 10, 1985, I stated we were going to make a brief survey of our Local Unions that represent employees of electric utilities at the nuclear stations where we have the bargaining rights.

We received replies covering 31 operating nuclear power plant sites. At several of the sites there is more than one nuclear unit. The following comments are based on the information that was available to the IBEW representatives at the nuclear plants, and does not pertain to construction workers during the building of the facility or contractor employees once the plant is in production.

Eighteen replies indicated there was never a routine inspection by OSHA, nor was a request ever made. Also, excepting the NRC, no other federal or state agency ever made a routine inspection.

Four replies stated they knew of no routine inspections either by Federal OSHA or the state equivalent. But at each of the four locations there has been a fatal accident that Federal OSHA has investigated. At one of the plants there have been two fatalities, making a total of five OSHA investigations.

Seven locations indicated there had been routine OSHA inspections. Also, there had been a fatality at three of those locations, which OSHA had investigated.

One report stated there were not any routine inspections, but there also was a fatality which was not investigated by any outside agency.

One report indicated the state equivalent of OSHA made routine inspections.

One report stated there had not been any routine inspections. Twice the local union had requested OSHA to inspect unsafe working conditions, but the NRC denied access to the OSHA inspectors.

Best wishes,

Sincerely yours,

CHARLES H. PILLARD, *International President.*

Mr. GAYDOS. Also, without objection, the hearing record will include a statement from the Edison Electric Institute, an industry organization representing the electric utilities.

[The information follows:]

EDISON ELECTRIC INSTITUTE,
THE ASSOCIATION OF ELECTRIC COMPANIES,
Washington, DC, July 31, 1985.

Hon. JOSEPH M. GAYDOS,
Chairman, Subcommittee on Health and Safety, Committee on Education and Labor, U.S. House of Representatives Washington, DC.

DEAR MR. CHAIRMAN: Thank you for the opportunity for the Edison Electric Institute to submit a statement for the record of the hearing on July 10, 1985 before the Subcommittee on Health and Safety.

The electric utility industry has always been concerned for the safety of its workers, and is dedicated to further improvement in overall safety performance through responsible plant management and cooperation with such organizations as the Institute of Nuclear Power Operations and the International Brotherhood of Electrical Workers. We intend to keep our industry one of the safest places to work in the nation.

If you have any questions or desire to discuss the safety of our workers in further detail, please do not hesitate to contact us.

Sincerely yours,

THOMAS R. KUHN.

PREPARED STATEMENT OF THE EDISON ELECTRIC INSTITUTE

The following statement presents the views of the Edison Electric Institute on the Health and Safety practices at our electric generating stations.

EEI is the association of the investor-owned electric utilities whose members generate approximately 75 percent of all the electricity in the country and service approximately 73 percent of all the ultimate customers in the nation. In providing this essential energy to every segment of our society, the electric utility industry has from its earliest beginnings adopted the fundamental philosophy that the safety of the public, of customers, and of employees is and shall remain a primary consideration in the conduct of its business.

Because of the potential safety implications in the production and delivery of electric energy, the industry has traditionally placed a high emphasis on training, experience and the development and enforcement of safe work practices. Over the years, electric utility companies have developed comprehensive, dynamic safety rules applicable to the unique and constantly changing aspects of the electric utility work environment which have successfully reflected the state-of-the-art in the industry.

Over the past several decades, the industry, through the Edison Electric Institute, has maintained an accident prevention committee today known as the Safety & Industrial Health Committee. The express purpose of this committee was and remains to provide a forum for safety professionals to exchange ideas concerning techniques and practices that would further safeguard employees. The net result of this constant and continuing concern for safety is the excellent safety record that the industry has achieved. This record attests not only to the concern and commitment of electric utility management, but also to the increasingly active role that employees are encouraed to take in assuring that their safety and the safety of the public is maintained at the highest level.

Although employee safety remains the responsibility of the management of utilities, the active and responsible role of the International Brotherhood of Electrical Workers and Utility Workers Union of America, in helping to develop safety standards for the industry has served to improve the excellent record that presently exists. For the year 1983, this record indicates a total incidence rate of 5.14 for all reportable accidents. This incidence rate for all industry in 1983 was 7.6. The rate for construction was 14.8, and for the Manufacturing sector, it was 10.0. The methods used in calculating these rates is the one endorsed by OSHA: number of cases (x) 200,000 divided by total number of man-hours worked. The existence of these low rates in the electric utility industry is the best testimony to the success that utilities have achieved in providing a safe working environment. The fact that deaths and serious injuries do occur serves as a sobering reminder that the safety of employees and the public must continue to be a primary consideration for electric utility companies.

Nuclear energy used to produce electricity has quite predictably placed the safety of this relatively new technology in sharp focus—a focus on safety that vastly exceeds the safety concerns of any technological advancement that has occured since the industrial revolution. In little more than 25 years, nuclear power grew from a single nuclear generating station to the second largest source of electricity in the

country. During this period of growth the industry has been able to respond to the challenge and has achieved an outstanding safety record.

Workers at nuclear plants are exposed to small, controlled amounts of low level ionizing radiation during the course of their employment. The Nuclear Regulatory Commission (NRC) sets the radiation exposure limits for these workers, and requires that all exposure to ionizing radiation be monitored and recorded. Each plant is required to comply with strict NRC regulations and maintain accurate radiation exposure records for each worker. This information is provided to the NRC annually, where it is summarized and made public in an annual report (NUREG 0714).

The industry is greatly concerned for the safe operation of nuclear energy plants and the safety of its workers and the public. The industry established the Institute of Nuclear Power Operations (INPO) to promote standards of excellence for the operation and maintenance of its nuclear stations. To achieve excellent performance, INPO does periodic evaluations at each nuclear plant site to determine the appropriateness of actual plant operation. These evaluators look at the way work is being done and their findings are compared to performance at other plants. The objective is not to just comply with the regulatory limits, but to achieve low radiation-exposure and high safety and performance results. For example, through the implementation of an INPO program, the number of personnel exceeding five rem at any one facility was reduced from a high of 311 in 1980, to 0 in 1984.

In the years ahead we can expect further improvement in nuclear plant performance. The industry, through INPO has made major commitments to provide broader training for nuclear station personnel, to apply increased attention to operations, maintenance and radiological control practices, and to share with each other the most effective and safe way to get a job done.

The electric power, industry is committed to provide economical and reliable electricity, and in doing this we intended to keep our industry one of the safest places to work in the nation.

Mr. GAYDOS. I sincerely hope our witnesses will address the questions raised by the IBEW letter, because this is where the committee is directing its focus, particularly at this hearing.

Gentlemen, on behalf of the committee I again apologize as far as conflicting schedules here in the House. You may proceed; and as to who is first and second, we will let you argue that among yourselves.

Mr. Hayes, from the great State of Illinois you are most welcome over here.

Mr. HAYES. Good morning.

Mr. GAYDOS. Gentlemen, do you want to identify yourselves for the record.

STATEMENT OF JAMES G. PARTLOW, DIRECTOR, DIVISION OF INSPECTION PROGRAMS, OFFICE OF INSPECTION AND ENFORCEMENT, U.S. NUCLEAR REGULATORY COMMISSION, ACCOMPANIED BY FRANK CONGEL, CHIEF OF RADIOLOGICAL ASSESSMENT BRANCH

Mr. PARTLOW. Gentlemen, I will begin.

My name is James Partlow. I am the Director of the Division of Inspection Programs in the Office of Inspection and Enforcement with the Nuclear Regulatory Commission, and I am pleased to represent the NRC at this hearing concerning the health and safety of workers in nuclear powerplants.

With me is Mr. Frank Congel who is chief of the Radiological Assessment Branch for the NRC and a health physicist.

In view of the opening remarks by the chairman, I thought I would briefly discuss the NRC's regulation of worker safety against radiological hazards in nuclear powerplants. That is the area in which the Nuclear Regulatory Commission is chartered to be responsible.

We carry out those responsibilities for the protection against radiation hazards of workers through a system of development of rules and regulations which prescribe the procedures, the programs, the training, the notification and so forth which are to be carried out on site of a nuclear powerplant to minimize radiation exposures.

One of the basic concepts of our regulations is what is known under the acronym of ALARA, as low as reasonably achievable. In addition to setting maximum radiation exposure doses for workers in nuclear powerplants, our regulations ask that all utilities establish programs that will maintain exposures as low as reasonably achievable, and this concept has been well accepted throughout the nuclear industry and is a part of our regulatory process.

Given the standards that are then developed for radiation exposures, we then license each individual operating nuclear powerplant against those standards. Each nuclear powerplant submits to us their program for maintaining radiation exposures ALARA, and in the Office of Nuclear Reactor Regulation under, for example, Mr. Congel, we review those programs for their adequacy and for their completeness in carrying out these programs.

Finally, in my office, the Office of Inspection and Enforcement, and through our five regional inspection offices, we conduct inspections at all nuclear powerplants both before they are licensed and throughout their life in a variety of areas of nuclear safety, including the radiation protection programs. In addition to the inspection aspects, we have enforcement sanctions to ensure that deficiencies in programs are corrected and that programs are put into place to prevent recurrence.

Another adjunct to what I believe is happening now in the nuclear industry and the protection of workers against radiation hazards is the emerging influence of the Institute of Nuclear Power Operations. This is an industry organization that was established in 1981, headquartered in Atlanta. Its membership consists of every utility who operates and constructs a nuclear powerplant. That organization has dedicated itself to excellence in the operation of nuclear powerplants, including the protection of the workers against radiation exposure.

The NRC is cooperating with INPO. INPO develops their own standards of excellence for the maintaining of good radiation protection programs, INPO then evaluates all utilities and all nuclear powerplants to see how well they are doing in meeting those standards. We have a cooperative agreement with them, INPO and the NRC, and we are evaluating the progress that is being made there.

I would like to point out some information that we have, latest information concerning the level of exposures which are received by workers in nuclear powerplants. A preliminary review of data on worker exposures for calendar year 1984 indicates that the average worker exposure is about 0.56 rem.rem and equivalent man-rem were lower last year than in any of the 15 years for which the NRC has comprehensive data. Nearly 98,100 workers received measurable radiation exposure in 1984. This is up from 86,000 in 1983. The total collective exposure for these workers was about 55,200 man-rem in 1984 as compared to 56,500 man-rem in 1983.

Finally, I would like to touch upon our relationship with OSHA in the total protection of workers at nuclear powerplants. As I mentioned earlier, the NRC's responsibility has to do with the radiation aspects of nuclear power construction or operations, and that is the area in which we inspect and enforce.

As recently as last year the management of OSHA and NRC met and exchanged correspondence which describes our relationship at nuclear powerplants. It is basically an agreement in which our regional offices located throughout the country, and with our resident inspectors whose duty station is on site at each of the nuclear powerplants, maintain cognizance of matters of industrial safety and in any cases which we believe are worthy of notification to OSHA, that takes place so that OSHA may conduct the appropriate inspections and carry out their responsibilities.

I believe that covers the essense of my testimony, Mr. Chairman, Mr. Hayes. I would be happy to answer any questions.

[The prepared statement of James G. Partlow follows:]

PREPARED STATEMENT OF JAMES G. PARTLOW, DIRECTOR, DIVISION OF INSPECTION PROGRAMS, OFFICE OF INSPECTION AND ENFORCEMENT, U.S. NUCLEAR REGULATORY COMMISSION

Mr. Chairman and Members of the Subcommittee: My name is James G. Partlow. I am the Director of the Division of Inspection Programs in the NRC's Office of Inspection and Enforcement. I am pleased to represent the NRC at this hearing concerning the health and safety of workers in nuclear power plants.

The mission of the Nuclear Regulatory Commission (NRC) is to assure that nonmilitary uses of nuclear materials in the United States—as in the operation of nuclear power plants or in medical, industrial or research applications—are carried out with proper regard and provision for the protection of public health and safety and of the environment, the safeguarding of nuclear materials and facilities from theft and sabotage, and safe transport and disposal of nuclear materials and wastes.

The NRC discharges its responsibilities through the issuance of rules and regulations governing licensed activities, the licensing of nuclear reactor operations and other possession and use of nuclear materials, and inspection and enforcement actions.

NRC regulation of occupational radiation exposure at nuclear power plants involves the collaborative efforts of its Office of Nuclear Regulatory Research, which develops regulatory standards; the Office of Nuclear Reactor Regulation, which licenses nuclear power plants; and the Office of Inspection and Enforcement and the five NRC Regional Offices, which conduct inspection and enforcement activities.

Applicable NRC regulations are contained in title 10, Chapter 1, of the Code of Federal Regulations. The regulations for protecting workers against ionizing radiation are contained primarily in Part 20 of these regulations, "Standards for protection against radiation," and in Part 19, "notices, instructions and reports to workers; inspections." The licensing of nuclear power plants is covered by Part 50 of these regulations.

Part 20 of the NRC regulations, which covers worker protection, includes both numerical limits on occupational radiation exposure and a statement that NRC licensees should, in addition to complying with the requirements of Part 20, make every reasonable effort to maintain radiation exposures "as low as is reasonably achievable." The concept of "as low as is reasonably achievable" takes into account the state of technology, and the economics of potential improvements in relationship to benefits to the public health and safety. The concept, which is known by the acronym "ALARA," has been widely accepted by the nuclear power industry.

Part 20 does not differentiate between women and men with respect to occupational dose limits. To provide adequate radiation protection for the embryo/fetus and to mimimize the restriction of female employment, reliance is placed on the instruction of workers and the informed consent of the woman to the potential dose from occupational exposures.

In addition to its regulations, NRC also provides industry standards in the form of Regulatory Guides. Regulatory Guides describe methods acceptable to the NRC staff for implementing specific parts of NRC regulations. Division 8 of the Regulatory

Guide series covers radiological health. A total of 29 Regulatory Guides have been published in this series, to date.

Another NRC document containing regulatory criteria is the Standard Review Plan, which is used by the NRC licensing staff in its review of applications for a license to operate a nuclear power plant. Proposed measures to ensure that occupational radiation exposures are maintained ALARA are included in this review. The license to operate a nuclear power plant includes, in the Technical Specifications for the plant, requirements for personnel radiation protection procedures and other requirements for radiation protection of workers.

The NRC conducts inspections of nuclear power plants both before and after they are licensed to operate. The NRC inspection program is performed by headquarters- and region-based inspectors and by resident inspectors. Region-based inspectors include specialists in occupational radiation protection. Resident Inspectors stationed at each power plant are generalists who concentrate on the safety of day-to-day operations, including control room activities, system lineups, and event followup. Radiological safety inspections are conducted using detailed NRC inspection procedures which reflect lessons learned from special team inspections, called "Health Physics Appraisals," that were performed at all operating reactors following the accident at the Three Mile Island plant in Pennsylvania.

The NRC has several programs which are directed at reducing occupational exposure levels encountered by nuclear power plant workers. These efforts encompass the following:

(1) During the licensing process, licensee radiation protection programs are reviewed by NRC staff health physicists to ensure that measures to keep occupational radiation exposures as low as reasonably achievable (ALARA) are incorporated in the licensee's radiation protection program.

(2) Operating reactor radiation protection programs are routinely inspected in all areas by regional health physics inspectors. Non-routine health physics team appraisals are conducted as needed.

(3) Appropriate enforcement sanctions (notices of violation, civil penalties, orders) are used as necessary to ensure that deficiencies in licensee programs identified during inspections are promptly corrected and that measures are taken to preclude recurrence.

(4) The NRC's Systematic Assessment of Licensee Performance (SALP) process provides a periodic, integrated assessment of licensee performance in radiation protection based on inspections and licensing actions.

(5) Based upon inspection results, the NRC disseminates regulatory reports and information notices to all licensees in order to feedback operational experience. These reports are specifically aimed at reducing individual and collective radiation exposures in the field.

(6) In order to achieve mutual goals in radiation protection programs at power reactors, the NRC has entered into a cooperative agreement with the Institute of Nuclear Power Operations (INPO)—An industry group consisting of all utilities which construct and operate nuclear power plants. INPO teams periodically evaluate utility programs for radiological protection (as well as other areas which are important to nuclear safety) using performance objectives and criteria developed by INPO. The NRC will evaluate industry performance under this program.

A preliminary review of data on worker exposures for Calendar Year 1984 indicates that the average worker exposure (0.56 rem) was lower last year than in any of the fifteen years for which NRC has comprehensive data. Nearly 98,100 workers received measurable radiation exposure in 1984 as compared to about 86,000 in 1983. The total collective exposure for these workers was about 55,200 man-rem in 1984 and 56,500 man-rem in 1983.

The NRC's regulatory activities related to worker health and safety are limited to responsibilities for radiological health and safety involving radiation sources regulated by the NRC.

Another Federal agency, the Occupational Health and Safety Administration (OSHA) of the U.S. Department of Labor, has responsibility for non-radiological health and safety in the work areas of NRC-licensed facilities. OSHA also has responsibilities for radiological health and safety involving worker exposures from radiation sources not regulated by the NRC. Examples of such sources include X-ray equipment, accelerators, Accelerator-produced radioactive materials, and naturally-occurring radioactive materials such as radium. OSHA and the NRC have recognized their related responsibilities for workers' health and safety in NRC-licensed facilities. During discussions in 1984, NRC and OSHA reaffirmed guidelines for interface activities between the two agencies. These guidelines are included as a chapter in the NRC Inspection and Enforcement manual, "Interfacing Activities Be-

tween Regional Offices and OSHA"which is provided to each of the NRC's five regional offices. The objectives of this Manual Chapter are (1) to ensure that information regarding events, unsafe conditions, and other matters dealing with occupational safety and health are referred to the proper agency for action, and (2) to provide policy and interface guidelines for the exchange of information at the regional level.

This concludes my prepared testimony. I would be pleased to answer any questions you may have.

Mr. GAYDOS. Mr. Miles, please. Welcome back to the committee. You are becoming a regular attendee.

STATEMENT OF JOHN B. MILES, JR., DIRECTOR OF FIELD OPERATIONS, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

Mr. MILES. That is right.

I am John Miles, Director of Field Operations of the Occupational Safety and Health Administration.

I would like to thank you, Mr. Chairman and members of the subcommittee, for the opportunity to discuss the role of the Occupational Safety and Health Administration in ensuring safe and healthful working conditions at the Nation's nuclear powerplants.

Before I describe OSHA's activities at the nuclear powerplants, let me explain Federal occupational safety and health jurisdiction at these facilities.

As you are aware, Mr. Chairman, the Occupational Safety and Health Act of 1970 covers virtually all the Nation's private employers. The Congress anticipated the potential duplication of Federal effort which could result from providing OSHA with such broad authority by including language in the act which takes into account other Federal laws which deal, in varying degrees, with employee safety and health.

Under section 4(b)(1), the act's provisions do not apply to those working conditions of employees for which another Federal agency, or a State agency acting under section 274 of the Atomic Energy Act of 1954, as amended, exercise statutory authority to prescribe or enforce standards or regulations affecting occupational safety or health. As you are aware, Secretary Brock has asked OSHA to review the subject of interagency jurisidiction. We have begun the review and we will inform our oversight committees of the results.

NRC has licensing authority for all nonmilitary uses of source, byproduct and special nuclear materials. Generally speaking, these are the three classes of materials that are involved in the nuclear fission process at nuclear powerplants. As part of its general licensing authority, NRC has issued regulations to limit employee exposure to radiation from these licensed sources. NRC enforcement of its rules is carried out through a system of regional and resident powerplant inspectors. Because NRC has the appropriate regulatory authority and implements its authority through the enforcement of employee protection regulations, section 4(b)(1) of the act prohibits enforcement of OSHA's standards for the radiation sources which are subject to NRC's licenses. With the exception of those particular hazards posed by radioactive materials specifically covered by an NRC license, however, OSHA retains full authority at nuclear powerplants.

Thus, OSHA standards apply to construction hazards during the initial construction of the plant, while maintenance operations are being performed, and after the plant has gone into operation. In addition, OSHA regulates any general industry hazards that may be found in a nuclear powerplant when the plant is in operation, for example, hazards associated with walking and working surfaces, machine guarding and exposure to toxic fumes and solvents. OSHA's radiation standards cover certain radiological hazards not covered by the powerplant's NRC license such as those from x rays and naturally-occurring radiation like radium.

OSHA and NRC have had a long, cooperative relationship to eliminate redundancy, to ensure safe and healthful working conditions for employees and to reduce the burden of duplication for employers. In 1972, in close cooperation with OSHA, the NRC issued guidelines concerning the division of responsibility between OSHA and NRC. These guidelines explain that OSHA is responsible for nonradiological hazards at NRC-licensed facilities as well as for those radiological hazards which are not covered by NRC licensing authority. The guidelines also specify the need for interagency referrals. OSHA is responsible for informing NRC of any violations of NRC licensing agreements which OSHA may discover during an inspection.

In January of this year we distributed an updated guideline to our field staff on this subject. Similarly, NRC apprises OSHA of hazards which NRC cannot address under its authority.

Last week NRC notified OSHA of nonradiological hazards at the Hancock Bridge, NJ, Oak Creek Nuclear Plant. Our area office is investigating the incident.

Since 1978 OSHA has conducted more than 1,300 inspections at nuclear powerplants. More than 130 were conducted while the plants were in operation, the remainder while the plants were under construction. Thus, employees at the 94 nuclear powerplants now operating under the NRC license receive protection from NRC an agency with a high level of expertise in nuclear safety and health matters. They are also protected under the Occupational Safety and Health Act for the other hazards which they may face in the performance of their duties.

This concludes my prepared remarks, Mr. Chairman, and I would be glad to answer any questions.

[The prepared statement of John B. Miles, Jr., follows:]

PREPARED STATEMENT OF JOHN B. MILES, JR., DIRECTOR OF FIELD OPERATIONS, OSHA

Mr. Chairman and Members of the Subcommittee: Thank you for the opportunity to discuss the role of the Occupational Safety and Health Administration (OSHA) in ensuring safe and healthful working conditions at the nation's nuclear power plants.

Before I describe OSHA's activities at nuclear power plants, it may be useful to explain Federal occupational safety and health jurisdiction at these facilities.

As you are aware, Mr. Chairman, the Occupational Safety and Health Act of 1970 (the Act) covers virtually all the nation's private employers. The Congress anticipated the potential duplication of Federal effort which could result from providing OSHA with such broad authority by including in the Act a section which takes into account other Federal laws which deal, in varying degrees, with employee safety and health. Under section 4(b)(1), the Act's provisions do not apply to those working conditions of employees for which another Federal agency, or a state agency acting under section 274 of the Atomic Energy Act of 1954, as amended, exercise statutory

authority to prescribe or enforce standards or regulations affecting occupational safety and health. It should be noted that Secretary Brock has asked OSHA to review the subject of interagency jurisdiction and we will inform our oversight committees of the results of this review.

With respect to nuclear power plants, the U.S. Nuclear Regulatory Commission (NRC) has licensing authority for all non-military uses of source, byproduct, and special nuclear materials. Generally speaking, these are the three classes of materials that are involved in the nuclear fission process at nuclear power plants. As part of its general licensing authority, NRC has issued regulations to limit employee exposure to radiation from these licensed sources. NRC enforcement of its rules is carried out through its regional and resident power plant inspectors, some of whom are experts in the field of radiation. Under NRC's statutory authority, appropriate actions are taken to ensure that licensees implement programs to control employee exposure to radiation from licensed materials.

Because NRC possesses the appropriate regulatory authority and implements its authority through the enforcement of employee protection regulations, section 4(b)(1) of the Act prohibits the enforcement of OSHA's standards for the radiation sources which are subject to NRC's licenses. With the exception of those particular hazards posed by radioactive materials specifically covered by an NRC license, however, OSHA retains full authority at nuclear power plants.

Interpretations of the Act by the Occupational Safety and Health Review Commission and the Courts of Appeals have held that OSHA's authority is not preempted for every hazard in an industry simply because some of the hazards of that industry are regulated by another Federal agency. Thus, except for those hazards which are regulated under NRC's licensing authority, employees at nuclear power plants are afforded the same level of protection under the Act as employees in other industries.

For example, OSHA's standards continue to apply to construction hazards during both the initial construction of the plant and while maintenance operations are being performed. OSHA also requires hazards of a general industry nature such as walking-working surfaces, machine guarding, and exposure to toxic fumes and solvents. These OSHA standards apply even when the nuclear power plant is in full operation. OSHA's radiation standards cover certain radiological hazards, such as those from X-rays and naturally occurring radiation like radium, since these radiation sources are not covered by the power plant's NRC license.

In recognition of the need for a coordinated Federal approach to mitigate hazards at nuclear power plants, OSHA and NRC have had a long, cooperative relationship to eliminate redundancy, to ensure safe and healthful working conditions for employees, and to reduce the burden of duplication for employers. In 1972, in close cooperation with OSHA, the NRC issued guidelines concerning the division of responsibility between OSHA and NRC. These guidelines explain that OSHA is responsible for non-radiological hazards at NRC-licensed facilities as well as those radiological hazards which are not covered by NRC licensing authority. The guidelines also specify the need for interagency referrals of information. In this way, OSHA is kept apprised of hazards which NRC may not be able to address under its authority. Similarly, OSHA is responsible for informing NRC of violations of its licensing agreements which may be discovered during the course of an OSHA inspection. As recently as January of this year, updated guidelines were distributed to OSHA's field staff to ensure the continued coordination of the agencies' activities.

Since 1978, OSHA has conducted more than 1,300 inspections at nuclear power plants. About 1,200 of these were conducted while the plant was under construction. Of these inspections, which normally involved contractors and subcontractors, about half were programmed inspections and about one-sixth of the inspections were in response to employee complaints. The remainder were inspections conducted in response to referrals, accidents involving employee injuries or fatalities, or in follow-ups to previous inspections.

During this same time period, OSHA conducted more than 130 inspections at operating nuclear power plants. Of these inspections, about one-third were programmed and another third were in response to employee complaints.

In closing, Mr. Chairman, it should be noted that employees at the 94 nuclear power plants now operating under NRC licenses receive protection from NRC, an agency with a high level of expertise in nuclear safety and health matters. This protection includes the services of a resident inspector at each facility to address questions concerning occupational exposure to radiation hazards from licensed materials. These same employees are also guaranteed the protections of the Occupational Safety and Health Act for the other hazards which they may face in the performance of their duties.

This concludes my prepared remarks, Mr. Chairman. I will be happy to answer questions you and members of the Subcommittee may have.

Mr. GAYDOS. Gentlemen, either or both of you can respond to questions, and we will proceed along those lines, and let me ask the first one.

The letter we got from the IBEW, especially on the point concerning NRC's denial of access to OSHA inspectors, seems to raise a number of questions to the members of the committee. Let me ask you, under what kind of circumstances, if any, can or should NRC deny access to another agency, particularly when its presence has been sought or requested by an employee? How do you address that situation?

Mr. PARTLOW. First, Mr. Chairman, the NRC does not control access to nuclear powerplants. Access to nuclear powerplants is controlled by the owner and operator. Anyone who meets NRC criteria in terms of security clearance and so forth, if they want unescorted access, can have access to a nuclear powerplant and the NRC does not say yes or no as to whether or not they can have access.

Mr. GAYDOS. Would the committee or would anybody else be under a misconception if someone were to accuse or to suggest that you did deny access through some of your actions, direct or indirect? Would that be a misnomer or misthought?

Mr. PARTLOW. It could be, Mr. Chairman. The only other thing that I can think of is that it may have to do with some condition, some event, and then the question arose who should take the lead, who should take the lead for the Federal Government in investigating and evaluating this condition. But I have no specific information on what that event might be.

Mr. GAYDOS. Well, if somebody in a written accusation suggested that the NRC did deny access to an OSHA inspector, if that were the accusation, would you say they would be wrong or would it have some substance or do you know anything about it?

Mr. PARTLOW. I do not know anything specifically about it. I would say if that happened categorically there was something wrong and we would—I would want to look into why.

Mr. MILES. Mr. Chairman, do you have any specifics on the accusations? I am not aware of that occurring, and that is why I would like—if you have any specifics—to find out about it.

Mr. GAYDOS. Let us make them available through an interrogatory to you and you can respond that way.

Let me ask you a general question. Have either or any of you ever been informed that has occurred at any facility?

Mr. MILES. I have not, no.

Mr. PARTLOW. I have not, Mr. Chairman.

Mr. GAYDOS. You never heard of it, and your records show nothing of it?

Mr. PARTLOW. No, sir; I have a recollection several years ago of hearing of a situation in which there were discussions as to who was responsible for continuing looking at a condition, but I certainly remember no aspect of the NRC denying OSHA access or vice-versa in those kinds of situations.

Mr. GAYDOS. What about your routine inspections? Do we have them or do we not have them and if we do not have them, why do we not have them? Either one.

Mr. MILES. With OSHA we do have regular inspections. As we said, we have made 49 general schedule inspections in nuclear powerplants since 1978. We target inspections based on injury rates in industries, but we did do some general schedule inspections in nuclear powerplants and we do respond to complaints from employees.

Mr. GAYDOS. Let me ask it a little different way. We are pretty familiar with the illness and injury criteria, and that is always open to debate, as to whether the records are accurate and as to whether or not it is a good measuring rod, and that is not the purpose of the hearing, to get into that again.

But do either or any of you know, again I want to ask you specifically, of any particular instance whereby access was questioned or denied by either agency or an implication of either agency, maybe in a conflict between the agencies, because the complaint has been made and we will ferret it out, whether or not there is authenticity to it; but it would be a horrible situation if that were the case, do you not agree?

Mr. MILES. I agree, but I have no knowledge that it occurred. I would be glad to go back and check with our field staff and see if we have any instances like that. I do not think we do, but we might.

Mr. GAYDOS. Mr. Partlow.

Mr. PARTLOW. Yes, again, Mr. Chairman, I know of no case like that.

You asked about routine inspections, are they or are they not taking place. The NRC inspections of a variety of aspects of maintaining nuclear safety at nuclear powerplants—are taking place. We have at least one resident inspector at every nuclear powerplant, and specifically in the area of radiation protection routine inspections are conducted by our regional offices throughout the country. We have a total of some 35 or so health physicists in the field offices who routinely visit these plants and conduct inspections. They are there several times a year at every operating nuclear powerplant.

Mr. GAYDOS. As a matter of the record and practical consideration, do you think we are making enough inspections? Do you have sufficient personnel? Do you see any need for change in that area as far as your department is concerned, your responsibility?

Mr. PARTLOW. Within my department with the resources that have been made available, for example, in the next year, fiscal year 1986, although it is always good to do more, to look further, we believe we have the resources for inspections to carry out our mandate of ensuring that these plants operate safely.

Mr. GAYDOS. Did you have the resources this year and last year?

Mr. PARTLOW. Yes; the resources, adequate resources, have been there for the last several years.

Mr. GAYDOS. There are no changes then that have occurred?

Mr. PARTLOW. We have had moderate growth within the Office of Inspection and Enforcement. More plants are being licensed each month or so and becoming operational, and we need more people to

evaluate those plants, but we have been given the resources commensurate with the growth in the number of operating nuclear powerplants.

Mr. GAYDOS. Is the exposure formula adequate as far as you are concerned in your responsible position? You talk about exposure as low as reasonably possible, I think somewhere in that area.

Mr. PARTLOW. As low as reasonably achievable.

Mr. GAYDOS. What do you call that?

Mr. PARTLOW. ALARA.

Mr. GAYDOS. Is that sufficient criteria, measuring rod or whatever you want to call it, procedure? Is that sufficient as far as you are concerned?

Mr. PARTLOW. It can be sufficient only to the extent that utilities take it to heart and make it part of their routine practice with their workers at nuclear powerplants, and from my position I believe that is happening. Mr. Congel may want to speak more about what INPO, the Institute of Nuclear Power Operations, is doing. They have dedicated themselves to that program and to evaluating utilities; but just yesterday I was at a meeting with managers from a utility who were talking about the next outage for their nuclear powerplant, the work that had to be done, modifications and repairs and so forth, and they spoke in their budget not only of dollars but they spoke of rem, in other words, the amount of exposure that they had anticipated would take place as a result of that outage and how they had been working—to determine that figure in advance. They take whatever precautions they can that are reasonable to try to lower that dose rate for these activities. So I believe that the ALARA standard is the reasonable way to approach something like that.

Mr. GAYDOS. If we include as low as reasonably possible, would that designate or denote some type of uncertainty and that there is a possibility that presumes an exposure of some sort? Is this reasonably possible? It is like a reasonable man rule. Does it indicate itself by the very nature of using those terms that you have some doubt, there is some exposure, maybe it would almost be impossible to determine or to protect against?

Mr. PARTLOW. Mr. Congel.

Mr. GAYDOS. Who came up with ALARA? Who manufactured that?

Mr. CONGEL. That has been recommended by the International Commission on Radiological Protection.

Mr. GAYDOS. International?

Mr. CONGEL. Yes, sir.

Let me make a couple of remarks about radiation protection in general.

Mr. GAYDOS. Sure.

Mr. CONGEL. Let me define a couple of terms. Radiation protection applies both on an individual basis as well as on the exposed population basis. We have in our regulations doses and dose rates that limit the amount of individual exposure. These numbers are based on both international and national standards and are deemed sufficient to protect the individual. In addition we have——

Mr. GAYDOS. Let me interrupt just so I understand it correctly. You are already going on a presumption you cannot have a zero, right?

Mr. CONGEL. That is correct.

Mr. GAYDOS. Go ahead.

Mr. CONGEL. As a consequence of working in a nuclear powerplant environment some radiation dose will be incurred. So as I was saying, we protect the individual by virtue of the numbers that are in our regulations. In addition, we have statements in our regulations that say in addition to these limits one should exercise the best possible technique to keep the doses as far below the limits as they can, taking into account the economics of accomplishing that end. That is where what I would call the fuzziness comes in, which I believe was the direction of the question you were asking.

Exactly what limit you have on the collective dose, that is, the sum of the doses to all the workers, is not specified in our regulations. What we do through the programs carried out from Mr. Partlow's office is look at the way in which radiation protection is managed at the powerplant, and then we pass judgment on the overall effectiveness of the program. The basis that we have for evaluating the industry-wide efforts is by looking at the year end statistics. The statistics that are reported to us include the distribution of individual doses for each powerplant and, of course, the total exposure for each of the powerplants.

I can say that over the past 2 to 3 years we have had a trend turnaround from clearly increasing on the year-to-year basis, that is, the overall dose increasing on a year-to-year basis, to one where it has at least reached a plateau and, perhaps depending on what happens in the next couple of years, a reversal of trend, that is, where the numbers would actually decrease.

We have been working very closely with the organization INPO that Mr. Partlow referred to earlier because the industry, of course, has an interest in reducing the overall doses to the workers. Based on the close interactions we have had, they have come to the same conclusions we have, that we believe that we are turning around what was an increasing trend in the late 1970's and early 1980's.

Mr. GAYDOS. You mentioned the term "economics." As you know, we went through the court suits and all as far as cost efficiency, things like that. Am I reading it wrong or am I right when I say when you mention "economics" you are talking about costs?

Mr. CONGEL. Yes, sir. Because——

Mr. GAYDOS. Explain that a little bit for the record, the costs.

Mr. CONGEL. In a pure circumstance, and I say pure because it does not occur all the time, there is a tradeoff that one could be faced with. You can increase the dose to an individual or a group of workers to save money. The money may be saved in terms of the time it takes to complete a task. Conversely, you could maybe spend more money in preparing the task so the doses would be reduced. But then that translates into——

Mr. GAYDOS. That dose is going to be there.

Mr. CONGEL. How much of that dose is there is what you are trying to determine, whether it is 10 or 30. You may have a choice. It might be 10 if you take a longer time to do the job and perhaps

put up shield walls, and it may be 30 if you decide not to put up the shield walls, but you get the job done in half the time. If you get the job done in half the time, it may be a day earlier to get the plant back on line and generating electricity. Those are the kinds of tradeoffs.

Mr. GAYDOS. Who makes that decision? For instance, let's just take a situation to enable us to facilitate discussion. We are talking about a plant. We are talking about exposure levels. Who comes in there and says now we will cut this exposure level down to, say, the 20 minutes because if we cut it any more than that it is going to cost us too much money or we will let the man work there 2 hours, but we can spend this amount of money to cut down the exposure? I think that is what we are talking about, is it not? Who makes that determination? Who does it now? As a practical matter, who would do it? The engineer on site or company or your Nuclear Regulatory Commission or who does it?

Mr. CONGEL. Two parts to it. That is done on site, typically on site unless there is an offsite engineering group that some companies have, but it is typically done by the utility on site. The part that we look at as regulators is twofold: First of all, they have to ensure that the individual worker is within our limits that I mentioned earlier; second, our people look at the procedures they have in place for doing that very evaluation that you refer to. And if we——

Mr. GAYDOS. Who is "our people"?

Mr. CONGEL. The NRC inspectors. If it is a large procedure that requires a license amendment, then individuals on my staff would review the procedure. But that is an exception. Typically it is done virtually every day and is done with procedures that are in place that we have reviewed.

Mr. GAYDOS. Who represents the man that is being exposed? Who considers him, if anybody does consider him? Maybe he is expendable and he can be replaced anytime, but who argues his case, if anybody, or does he need an advocate?

Mr. CONGEL. I can look at that two ways: First of all, we protect the individuals, as I said, with the limits, the dose limits.

Mr. GAYDOS. With the general limit?

Mr. CONGEL. Yes, sir. They have to stay within those dose limits. They must stay within those dose limits.

Mr. GAYDOS. The Nuclear Regulatory Commission has already determined that.

Mr. CONGEL. That is right.

Mr. GAYDOS. Go ahead.

Mr. CONGEL. Whether an individual ends up his calendar year with, say, 0.56 REM which was the individual average for last year or whether he was up to the limit of perhaps 5 REM, depends on what type of work this individual was engaged in and how much his services were needed and so on. But we feel that the worker's interest is represented in our regulations because the limits are set such that he is protected.

Mr. GAYDOS. That is how it is addressed. This is how it occurs today under existing rules?

Mr. CONGEL. Yes.

Mr. GAYDOS. I would like to turn it over to my good friend, Mr. Hayes, but first I will ask one more question. We are talking about this thing and how it is occurring, and I want to get back again to how you people work together.

You mentioned guidelines between OSHA and NRC, and the note in your testimony is that one objective is to ensure that information regarding unsafe conditions and other matters such as standards and things like that, changes, that they are referred to the proper agency. I have a couple questions on that proposition that we set forth.

I am going to ask you how long have these guidlines been in effect? How often are they reviewed? Can I and the committee assume that your resident inspectors are the ones who would do the referrals and, if not, who would and how often the referral is made and when was the last time you changed things like that? Could you give me a general bird's-eye view on how that is working?

Mr. PARTLOW. I will go ahead from the NRC.

I believe these guidlines have been in effect since about 1972. They were most recently looked at last year, and the guidance which we give to each of our resident inspectors and to the regional offices in the form of what we call the inspection and enforcement manual was most recently issued in the spring or summer of 1984, I believe. And that provides these guidelines: When a reportable—when an event occurs that the NRC believes is in OSHA's cognizance, then we call, we get in touch with the OSHA office. In practice I believe sometimes this is done by the resident inspector from the site and in practice on other cases he may call in to his boss in one of our five regional offices and the notification may then come from a coordinator within our regional office.

Mr. GAYDOS. What about those resident inspectors, if I may ask? Are they qualified? Do they recognize unsafe conditions? Resident inspectors, what are their qualifications? How would I become a resident inspector or could I?

Mr. PARTLOW. Typically our resident inspectors are degreed in some engineering discipline and typically have worked in the nuclear industry in some capacity. Many of them come from direct experience as officers in the Navy Nuclear Propulsion Program or from work in government reactors or from the private sector. So they are degreed engineers. We call them generalists as opposed to specialists, and they are the kind of person who can learn. We send them through our own systems training at the NRC Technical Training Center, and they are the kind of people who are able to understand the basic concepts in a variety of disciplines that you need to understand what happens at a nuclear powerplant.

Mr. GAYDOS. Director, are you satisfied that they are qualified, efficient, and doing the job?

Mr. PARTLOW. Yes, sir. I believe the resident inspector program is a major success in our regulatory activities.

Mr. GAYDOS. What about those referrals between you two? Last year, just offhand, how many have occurred between you two and what has been OSHA's response and has it been cooperative? How has that worked?

Mr. MILES. I think it has. As late as last week we had one, the nuclear powerplant in New Jersey where they had an accident and carbon dioxide was actually released in a room and some people were overcome. The resident engineer, I believe, referred it to our regional administrator and we are out there now making an inspection, so we do work closely together.

There are other instances where they have referred things to us.

Mr. PARTLOW. I think this is a good example. This was on September 4 on the Hope Creek Plant where the fire suppression system using carbon dioxide accidently released and heavy concentrations of CO were in some places that were inhabited by people. That event was referred to OSHA, and OSHA is investigating it. As we go from here now on that event, each of our agencies has two somewhat specifically different interests. OSHA will be looking into the industrial safety of that system and why did that happen. This little event also raises questions in the NRC's mind about nuclear safety. That fire suppression system which is important to the safety of a nuclear powerplant, was it designed right, was it built right and will it work right if and when it is needed?

So we have coordinated that matter, and we each have our own responsibilities when something like that happens.

Mr. GAYDOS. It is a fascinating thought. It seems so difficult for me to understand why nobody wanted to take any responsibility for Three Mile Island, no agency and no referrals, and the records were very inadequate, things like that. Just a passing thought.

Mr. Hayes, our good friend from Chicago.

Mr. HAYES. You were doing very well, Mr. Chairman. Thank you.

There may be some redundancy in my questions. I do want to follow up on the electrical workers' complaint. Who would the Electrical Workers Union have filed a complaint with if the allegation of denial of access to OSHA for inspection was to be leveled? Would it have been your house?

Mr. MILES. They could file with us. Under our complaint procedure they could ask us to come in and make an inspection; and if we were refused entry, we would go to court for a warrant to gain entry. Not knowing the specifics, I cannot say what happened in this particular instance.

Mr. HAYES. You have no knowledge of any complaint having been filed at all?

Mr. MILES. We have made some complaint inspections at the nuclear powerplants. I think we have made——

Mr. HAYES. I mean by the Electrical Workers Union.

Mr. MILES. Not specifically by the electrical workers. I can supply that for the record when we go back and check our records to see if we have any.

Mr. HAYES. Is it the responsibility of NRC to make sure that OSHA is given access to make their inspection, if necessary?

Mr. MILES. I think NRC answered this a while ago.

Mr. HAYES. I said there might be some redundancy.

Mr. MILES. We would try to get access to a powerplant from the owner or operator, because that is who we would have to issue a warrant to. They would be the ones who would refuse us entry.

Mr. HAYES. I have been watching with interest this development situation in New York City on the transportation of nuclear wastes

through the Bronx and Queens. Is that action against NRC by New York City? Are you the one directly responsible for that? Are you the defendant in this pending litigation?

Mr. PARTLOW. I think it is more under the cognizance of the Department of Transportation.

Mr. HAYES. You would not have anything to do with it?

Mr. CONGEL. No, not directly. I am sure that we would be maybe peripherally involved, but it is primarily a Department of Transportation function.

Mr. HAYES. I want to be a little bit presumptious, but from what I hear and I guess the results of yesterday's election in New York indicated to the mayor—he said he would pursue this thing, was not going to give up. So I guess it got added impetus as a result of what happened yesterday. Whose side would you be on in this situation? [Laughter.]

Mr. CONGEL. You have to answer the question.

Mr. PARTLOW. I have no position, sir. [Laughter.]

Mr. HAYES. Thank you, Mr. Chairman.

Mr. GAYDOS. Mr. Miles, if we can accept the information we have in the IBEW letter, a reasonable person would conclude that OSHA is not targeting nuclear powerplants for inspection. Maybe you can explain to us for the record what is necessary before the agency would embark on a major inspection program within this industry. What is the situation?

Mr. MILES. I think there are only 94 plants operating in the country, and we have made 132 inspections since 1978 and 49 of those were general schedule inspections. So I think we have been in those particular places. We are making inspections in those. Again, I go back to our targeting system which is designed to point us to the places we consider the most hazardous, those with the highest injury rates. That is where we target our resources, but we do not do it at the expense of others. We have been in those 94 plants 132 times since 1978.

Mr. HOLZMAN. Forty-nine routine inspections.

Mr. MILES. General schedule inspections, yes.

Mr. HOLZMAN. Even there you may have duplicated on the plants you went to. You may not have done 49 separate nuclear facilities.

Mr. MILES. That is true, and some of those are in State plan States as well as Federal.

Mr. GAYDOS. In our letter, the authenticity of which is, of course, going to be checked with supportive documentation, it has been alleged there have been an awful lot of sites that have not had any inspections from anybody and that could be true, could it not?

Mr. MILES. Yes, sir, that could be true.

Mr. GAYDOS. You mention in your statement that a third of OSHA's inspections are programmed and a third were in response to employee complaints. What initiated the other third of the inspections? Were they all general?

Mr. MILES. We had some accident investigations. We had some referrals which would be from NRC or other agencies, some follow-up inspections and one Federal agency evaluation. The TVA has nuclear plants in Tennessee, and they are Federal employees. The TVA employees are not private sector employees.

Mr. GAYDOS. Specifically how or what kind of a complaint from an employee? What would he have to do to initiate a complaint? What would be the nature of his complaint in order that you would respond with an inspection of a nuclear plant. What would he be saying?

Mr. MILES. One inspection resulted from an employee complaining that there were no guardrails around a platform they were working on. We went out and made an inspection and found that complaint to be true and did issue citations. Our standards cover all the different types of work places. With the exception of radiation, hazards in nuclear powerplants are not much different than those in any other manufacturing type of work place.

Mr. GAYDOS. It is usual work sites: guardrails, steps, things of that nature?

Mr. MILES. Yes.

Mr. GAYDOS. Just because it is in a nuclear plant, that does not mean it would be a nuclear complaint per se.

Mr. MILES. Yes. The majority of the complaints I looked at were not about the nuclear radiation problems.

Mr. GAYDOS. I mentioned before there is an accusation that OSHA inspectors were refused admittance. Whether that is true or not, under what grounds could NRC refuse OSHA to respond to a worker's request for an inspection? Do you know of any?

Mr. MILES. I do not think they would. I have a person on my staff who coordinates with NRC and our regional office staff coordinate with NRC. If it were typically something covered by NRC's jurisdiction, that is, nuclear source material or something that was obviously under their jurisdiction, we would referr it to NRC since they would have jurisdiction.

Mr. GAYDOS. Would you respond.

Mr. PARTLOW. Mr. Chairman, I know of no condition under which NRC would or should take some kind of action to have the owner of the utility deny access to an OSHA or any other Federal representative to a nuclear plant.

Mr. GAYDOS. None?

Mr. PARTLOW. No, sir.

Mr. GAYDOS. In light of OSHA's targeting procedures—and we have already understood they are not targeted because they have not met your criteria on illness and accident, right?

Mr. MILES. Yes, sir.

Mr. GAYDOS. Not targeting per se. Would there be any value from your point of view in providing training for NRC resident inspectors so they could more quickly recognize maybe some serious hazards to the plants and they would be more beneficial to you? Do you see any need for that type of cooperation in that area?

Mr. MILES. They know the qualifications better than I do. We have an institute in Chicago where we put on a lot of training for the private sector and Government, and if they had a need for occupational safety and health training, we would be glad to have them in those courses.

Mr. GAYDOS. Director, is that interference in what you are doing?

Mr. PARTLOW. Mr. Chairman, I do not have any statistics, but I believe that on almost a routine basis our resident inspectors are cognizant of potential safety conditions. I believe they are qualified

to see many safety hazards in a plant: poor scaffolding, unsafe welding conditions, fire hazards, clutter, rails, and so forth, as he mentioned. And I believe that on a routine basis, as the Federal presence on site—the fact that industrial safety conditions could have implications for nuclear safety in the event of an accident, that our resident inspectors bring these matters to the attention of the plant superintendent, and my just brief discussions with some of our resident inspectors indicate that utilities are responsive to that and when it is brought to their attention, they do someting to fix it.

Mr. GAYDOS. How many resident inspectors do we have offhand?

Mr. PARTLOW. We have roughly 150 resident inspectors.

Mr. GAYDOS. We have agreement between you and OSHA or an understanding; is that not right?

Mr. PARTLOW. Yes, sir.

Mr. GAYDOS. You do have cooperation.

Mr. PARTLOW. Yes, sir.

Mr. MILES. Yes, sir.

Mr. GAYDOS. What we are trying to do is make that agreement meaningful and effective. Let me ask, are there any jurisdictional problems that the two agencies have had? If they have no jurisdictional problems, any problems from a practical aspect?

Mr. MILES. I do not know of any offhand that we have had. We deal with them like I said, on the regional level in our day-to-day operations and it seems to be working well. We do not seem to have any problems.

Mr. GAYDOS. You have no problems between the two agencies.

Mr. MILES. None that I know of.

Mr. GAYDOS. As a practical matter, would it be feasible for your resident inspectors to—we talked about receiving training from OSHA. You seem to think, Director, they are pretty well trained and they are doing the job. They have had no complaints and the cooperation does exist there.

Mr. PARTLOW. Yes, sir.

I do not want to overstate that. We are in no way qualified OSHA inspectors. I do not know what the qualifications are. So I do not want to overstate that position, but there are many of them who are people, for example, with my kind of background who served in nuclear submarines and know when they walk into or spot a hazardous situation.

Mr. GAYDOS. Let me give you some items to think about. Here are some stated accusations. Whether they are authentic or not remains to be seen. This is something for you to think about.

Eighteen replies—and this is from an in-house survey—18 replies indicate there was never a routine inspection by OSHA nor was a request ever made. It is very emphatic when I add that on. Also, excepting the NRC, no other Federal or State agency ever made a routine inspection on those sites. Four other replies received in this in-house survey stated they knew of no routine inspections either by Federal OSHA or the State equivalent, but at each of four locations there has been a fatal accident that Federal OSHA has investigated. At one of the plants there have been two fatalities, making a total of five OSHA investigations. One report stated there were

not any routine inspections, but there also was a fatality which was not investigated by any outside agency.

Could that happen?

Mr. MILES. They are required to report any fatalities to us that occur on the worksite. If they have specifics on that, we would like to know them. We definitely would check that out.

Mr. GAYDOS. One report had indicated a State equivalent of OSHA made routine inspections and one report stated there had not been routine inspections. Twice a local union asked OSHA to inspect unsafe working conditions, but the NRC denied access to the OSHA inspectors. That is the point where we have some disagreement.

Mr. Hayes, do you have any questions?

Mr. HAYES. I have just one more. I wondered if you have any records that would indicate how many times NRC has made complaints of unsafe conditions to OSHA? Do you keep any records of this sort?

Mr. PARTLOW. I am really unable to answer that. I can find out for the subcommittee. We have OSHA coordinators in each of our regions. I cannot speak to the accuracy and comprehensiveness of how they kept records on their referrals.

Mr. GAYDOS. The specific interest and concern, I guess, of NRC would be more in the direction of safeguards against theft and sabotage rather than working safety. That is OSHA's responsibility although you do have to work together; is that right?

Mr. PARTLOW. Yes. Our interests are in the safety of the operation of the nuclear powerplant from the point of view of the public, in the radiation protection of the workers at the nuclear powerplant, in the protection of the environment through those releases that are made from a nuclear powerplant and, finally, in the safety and security of the nuclear materials against theft, diversion, or sabotage of a nuclear powerplant.

Mr. HAYES. But it is OSHA's direct responsibility on the safety aspect of it; is that right?

Mr. MILES. Yes, we are responsible for worker safety. The safety responsibility is ours.

Mr. GAYDOS. Gentlemen, I want to thank you for your appearance. Director Partlow and Inspector Miles, we have to go to a markup which is commencing at this time. I want to thank you for coming here and I want you to understand that the inquiries made are made upon information made available to the committee. We are going to take a look at it, hopefully compile more specific statistics.

I want to thank our witnesses for their time and their willingness to respond to our inquiries; and as I mentioned earlier, the subcommittee will be looking at other cases where OSHA and another Federal agency have joint and overlapping jurisdiction to determine the effectiveness of the agencies in providing for the health and safety of workers.

The subcommittee will adjourn until the call of the Chair.

[Whereupon, at 10 a.m., the subcommittee adjourned.]

[Material submitted for inclusion in the record follows:]

U.S. DEPARTMENT OF LABOR,
ASSISTANT SECRETARY FOR OCCUPATIONAL SAFETY AND HEALTH,
Washington, DC, October 7, 1985.

Mr. SY HOLZMAN,
Deputy Staff Director, Subcommittee on Health and Safety, Committee on Education and Labor, House of Representatives, Washington, DC.

DEAR MR. HOLZMAN: Enclosed is the edited transcript of testimony by the Occupational Safety and Health Administration (OSHA) at the oversight hearing held by your Subcommittee on September 11.

As we promised Chairman Gaydos, we have looked into the allegation by the International Brotherhood of Electrical Workers (IBEW) that on two occasions OSHA inspectors were denied access to nuclear power plants by the Nuclear Regulatory Commission (NRC). On the basis of the information provided to us at the hearing, we have found no evidence that such refusals took place. If you can provide us with any additional information about these allegations, we will be glad to check our records again.

Thank you for inviting OSHA to appear at the hearing. If you have any questions, please contact me or Mrs. Rebecca Morris, my Special Assistant for Congressional Relations, at 523-6027.

Sincerely,

PATRICK R. TYSON,
Acting Assistant Secretary.

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